PB-217 072

TEMPERATURE STUDIES LOWER BISCAYNE BAY, FLORIDA

L. B. Tebo, Jr., et al

Federal Water Pollution Control Administration
Athens, Georgia

October 1968

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

87 Dahl, L. B. (U.S. F.W.P.C.A. S.E.W.L.)

PB 217 072

TEMPERATURE STUDIES
LOWER BISCAYNE BAY, FLORDIA

RECEIVED
LIBRARY
MAY 13 1969
FWPCA, OHIO BASIN REGION
4676 COLUMBIA PKWY., CINTI, O. 45226

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST WATER LABORATORY
TECHNICAL PROGRAMS
POLLUTION SURVEILLANCE

October 1968

94

TEMPERATURE STUDIES

LOWER BISCAYNE BAY, FLORIDA

L. B. TEBO, JR., AQUATIC BIOLOGIST

R. L. ESTES, ELECTRONIC ENGINEER

R. R. LASSITER, BIOMETRICIAN

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST WATER LABORATORY
TECHNICAL PROGRAMS
POLLUTION SURVEILLANCE

October 1968

FOREWORD

This report was prepared primarily for limited distribution to parties involved in the thermal problems of Lower Biscayne Bay, It does not present conclusions or suggestions for remedial or corrective action. Rather, it was prepared as a discussion basis among involved officials seeking problem solutions.

It is now being made available to a somewhat larger group of scientists and engineers because of its contribution to the body of data rapidly developing in the field of thermal pollution. It does not purport to be a definitive study; nor is the analysis of the data complete. Biological studies are being conducted by the Florida Power and Light Company and the Institute of Marine Science, University of Miami under Atomic Energy Commission and FWPCA grants. Further analysis of the data is continuing and will be subsequently published in engineering or scientific journals.

The Florida Power and Light Company is currently reviewing current practices for disposal of heated water discharges. Consequently, the patterns of heat influence during this study will probably not be observed permanently.

October 16, 1968

John R. Thoman
Director
Southeast Region
Federal Water Pollution Control Administration
Atlanta, Georgia

TABLE OF CONTENTS

	PAGE
FOREWORD	i
LIST OF FIGURES	iii
SUMMARY	1
INTRODUCTION	3
DESCRIPTION OF AREA	7
METHODS	9
Monitor Studies	9
Transect Studies	9
RESULTS	12
Monitor Studies	12
Transect Studies	15
APPENDICES	
A. Isotherms - July & August Data	32
B. Summary of Monitoring Data	55

LIST OF FIGURES

FIGURE		PAGE
1	Biscayne Bay Location Map	4
2	Lower Biscayne Bay, Florida, Turkey Point and Vicinity	6
3	Lower Biscayne Bay Monitoring Station Locations	11
4	Lower Biscayne Bay, Turkey Point and Vicinity, July Transect Locations	17
5	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, August Transect Locations	18
6	Lower Biscayne Bay Maximum Temperatures (^{o}F)	19
7	Lower Biscayne Bay Daily Range of Maximum Temperatures, August 12 - August 26, 1968	20
8	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 7/28/68	23
9	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 7/29/68, 0922-1104	24
10	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 7/29/68, 1620-1811	25
11	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 8/26/68, 1030-1130	26
12	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 8/26/68, 1500-1600	27
13	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 8/28/68	28
14	Lower Biscayne Bay, Florida, Turkey Point and Vicinity, Isotherms, 8/25/68	29
15	Lower Biscayne Bay Temperature Profiles - Transect #3, 7/29/68	30
A1-23	Isotherms - July and August Data	32-54

SUMMARY

Florida Power and Light Company is presently operating two fossil fuel power generating units at its Turkey Point Plant adjacent to Lower Biscayne Bay in Dade County, Florida. The Company plans to place two nuclear powered facilities in operation at the same site by 1971 or 1972.

The present units require 1,270 cubic feet per second (cfs) of water for cooling purposes, with a predicted maximum rise in water temperature across the condensers of 13°F. When the nuclear units are in operation there will be a requirement for 4,250 cfs of cooling water, with a predicted maximum rise in temperature across the condensers of 16°F.

To obtain background data on Bay temperature prior to installation of the nuclear facilities and to determine the temperature effect on the Bay of heated effluent from the existing facilities, the Federal Water Pollution Control Administration conducted thermal studies of Lower Biscayne Bay from April through August, 1968.

The studies were made using recording thermometers placed at selected locations throughout the Bay and by intensive short term transect studies in the vicinity of the Turkey Point facility.

Maximum Bay temperatures at those monitoring stations distant from and unaffected by the heated discharge ranged from 82°F in April to 90°F in August. In April, when only one generating unit was in operation, there was no appreciable increase in Bay temperature at those monitoring stations in close proximity to the effluent canals. In August, with both generating units in operation, maximum Bay temperature at these stations ranged from 93°F to 96°F, an increase

of 3° to 9°F over background temperature. At those stations influenced by the heated discharge, higher daily fluctuations in temperature occurred -- up to 9°F in 24 hours as compared with 3°F to 4°F at the unaffected monitoring stations.

In late July, during the intensive transect survey, a maximum temperature of 100°F was measured in the Bay adjacent to the effluent canals. During both the July and August intensive transect surveys, the temperature in the vicinity of the effluent canals was 9°F to 11°F over the background temperature of the Bay.

Movement of the heated effluent was invariably in a northeasterly direction around Turkey Point. Maximum movement was on the outgoing tide and water temperatures 4 to 4.5°F over background were found northeast of the tip of Turkey Point (3 1/2 miles from the lower discharge canal) on several occasions. On the basis of the transect studies rate of temperature change resulting from the discharge was as high as 4.5°F per hour at distances up to 850 yards offshore. Maximum rate of change under normal conditions, as shown by the monitors, was never in excess of one degree Fahrenheit per hour.

Discharge from the applicant canals was occasionally more saline than bay water with the result that temperature inversions occurred (warmer water near bottom).

TEMPERATURE STUDIES - LOWER BISCAYNE BAY

INTRODUCTION

In April 1967 Florida Power and Light Company placed one conventional fossil fueled power generating unit in operation at Turkey Point adjacent to Lower Biscayne Bay in Dade County, Florida (Figure 1). In May 1968 an additional fossil fueled unit was placed in operation and the Florida Power and Light Company is constructing two nuclear powered units to be placed in operation at the same site by 1971-1972.

The two fossil units have a combined maximum capability of generating 864,000 kilowatts (KWe) requiring a flow of 1270 cubic feet per second (cfs) of water for cooling purposes (Table 1). The nuclear units have a maximum capability of 1,520,000 KWe utilizing 2980 cfs of cooling water. The four combined units will have a total capability of generating 2,384,000 KWe with a cooling water flow of 4250 cfs.

As shown in Table 1, the above figures on power generation are maximum overload capability and the normal full load from all four units will approximate 2,080,000 KWe or 87 per cent of the maximum.

The July 1968 loads on the two units presently in operation ranged from 293,000 KWe to 742,000 KWe and the monthly average (based on 4 hour intervals) was 571,000 KWe. Peak loading occurred in the afternoon and early evening hours.

Water for cooling purposes is drawn from Lower Biscayne Bay at an intake location just north of and immediately adjacent to Turkey Point. The cooling water is then discharged back into the Bay south of Turkey Point via a series of canals located on Florida Power and Light property adjacent to the plant site (Figure 2).

The amount of water flowing across the condensers remains the same,

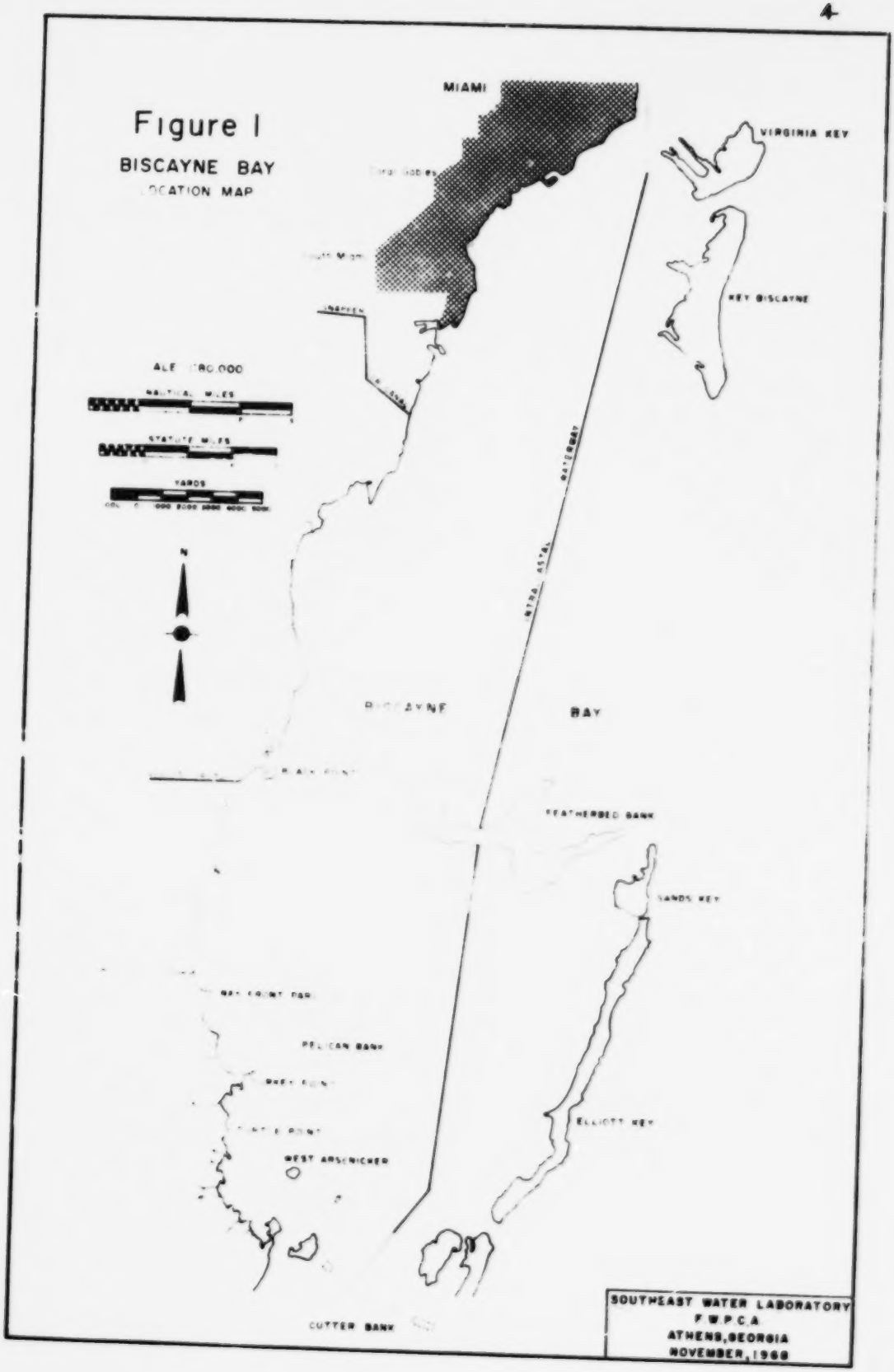


Figure 1

BISCAYNE BAY

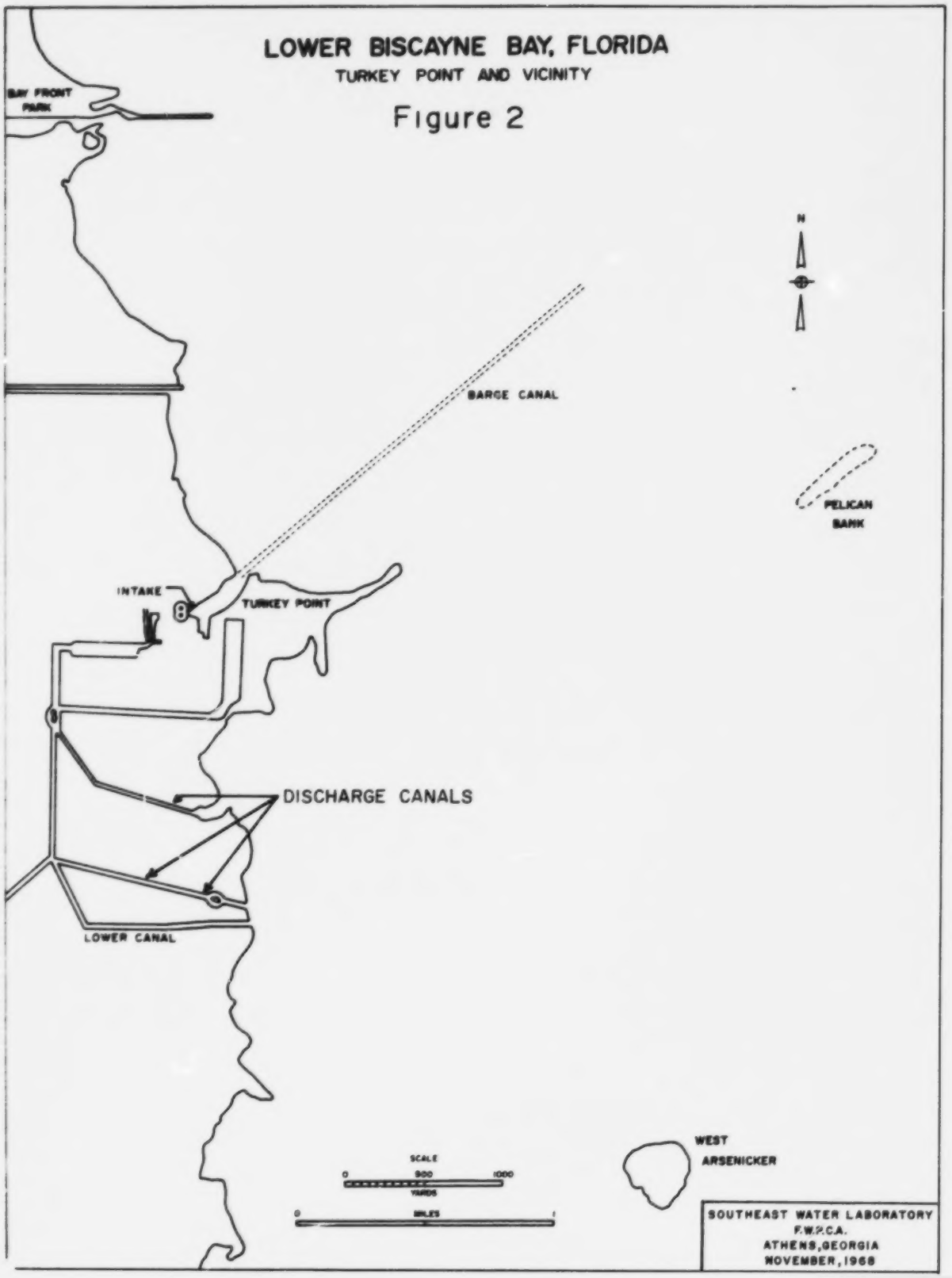
LOCATION MAP

TABLE 1

TURKEY POINT FACILITY, FLORIDA POWER AND LIGHT CO.
POWER OUTPUT CAPACITY AND WATER FLOW REQUIREMENTS[1]

	FOSSIL UNITS		NUCLEAR UNITS		COMBINED	
	POWER OUTPUT (KWe)	FLOW (CFS)	POWER OUTPUT (KWe)	FLOW (CFS)	POWER OUTPUT (KWe)	FLOW (CFS)
Normal Full Load	720,000	1270	1,360,000	2980	2,080,000	4250
Guaranteed Max. Capability	740,000	Same	1,456,000	Same	2,196,000	Same
Overload Capability	864,000	Same	1,520,000	Same	2,384,000	Same

[1]Data from Florida Power and Light by letter of March 11, 1968 to the Regional Director, Federal Water Pollution Control Administration, Atlanta, Georgia.


LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
Figure 2
BAY FRONT PARK
BARGE CANAL
N
PELICAN BANK
INTAKE
TURKEY POINT
DISCHARGE CANALS
LOWER CANAL
SCALE
0
500
1000
YARDS
0
1
MILES
WEST ARSENICKER
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

regardless of power generation, so that the rise in water temperature is a function of power generation. Predicted maximum rise in temperature across the condensers under normal generating loads is 13°F for the fossil plants and 16°F for the nuclear units (Table 2).

The Federal Water Pollution Control Administration conducted thermal studies of Lower Biscayne Bay from April to August, 1968. The purpose of these studies was to determine:

1. The temperature regime of Lower Biscayne Bay prior to installation of the nuclear facilities;
2. The effect, if any, of the existing conventional units on the temperature regime of the Bay.

Reproduced from best available copy.

DESCRIPTION OF AREA

Lower Biscayne Bay has maximum dimensions of 9 by 11 miles (approximately 100 square miles) and lies in an area bounded on the west by the Florida mainland, on the east by the Florida keys, and by Featherbed Bank and Cutter Bank on the north and south, respectively (Figure 1). The Bay is shallow with a maximum depth of 13 feet and an average depth between 5 and 6 feet.

The mean annual range of semi-diurnal tides is approximately two feet. Prevailing winds are from the southeast.

The direction and velocity of water movement is mainly a function of tide stage with movement in a northerly direction on ebb tide and in a southerly direction during flood. According to limited studies by Bureau of Sport Fisheries and Wildlife personnel current velocities are slow, generally less than 0.3 knots.

Salinity was measured on two separate occasions during the study (Table 3). Near Featherbed Banks and on the east side of the Bay

TABLE 2

TURKEY POINT FACILITY, FLORIDA POWER AND LIGHT CO.
PREDICTED RISE OF TEMPERATURE ABOVE INTAKE
TEMPERATURES AT VARIOUS LEVELS OF POWER GENERATION[1]

	POWER OUTPUT (KWe)	PREDICTED TEMPERATURE RISE (^{o}F)
Fossil Units	100,000	4
	200,000	7
	300,000	10
	400,000	13
Nuclear Units	200,000	6
	400,000	10
	600,000	14
	728,000	16

[1]Data from Florida Power and Light Co. by letter of March 11, 1968 to the Regional Director, Federal Water Pollution Control Administration, Atlanta, Georgia.

near the barrier islands the salinity ranged from near to slightly in excess of sea strength (34.9-38.5 parts per thousand, °/oo). On the west, or landward side of the Bay, in the vicinity of Turkey Point the salinity was much lower, ranging from 23.8 to 33.2 °/oo.

METHODS

Monitor Studies

Continuous temperature recording instruments were used to obtain a record of water temperature at selected locations in the Bay. The instrument used consisted of a spring wound, clock driven, 15 day chart with a bimetallic sensing element enclosed in a waterproof stainless steel case. The thermographs used had a range of 60 - 120°F and in a water bath had a measured full scale response time of two hours for a 60°F step increase in temperature.

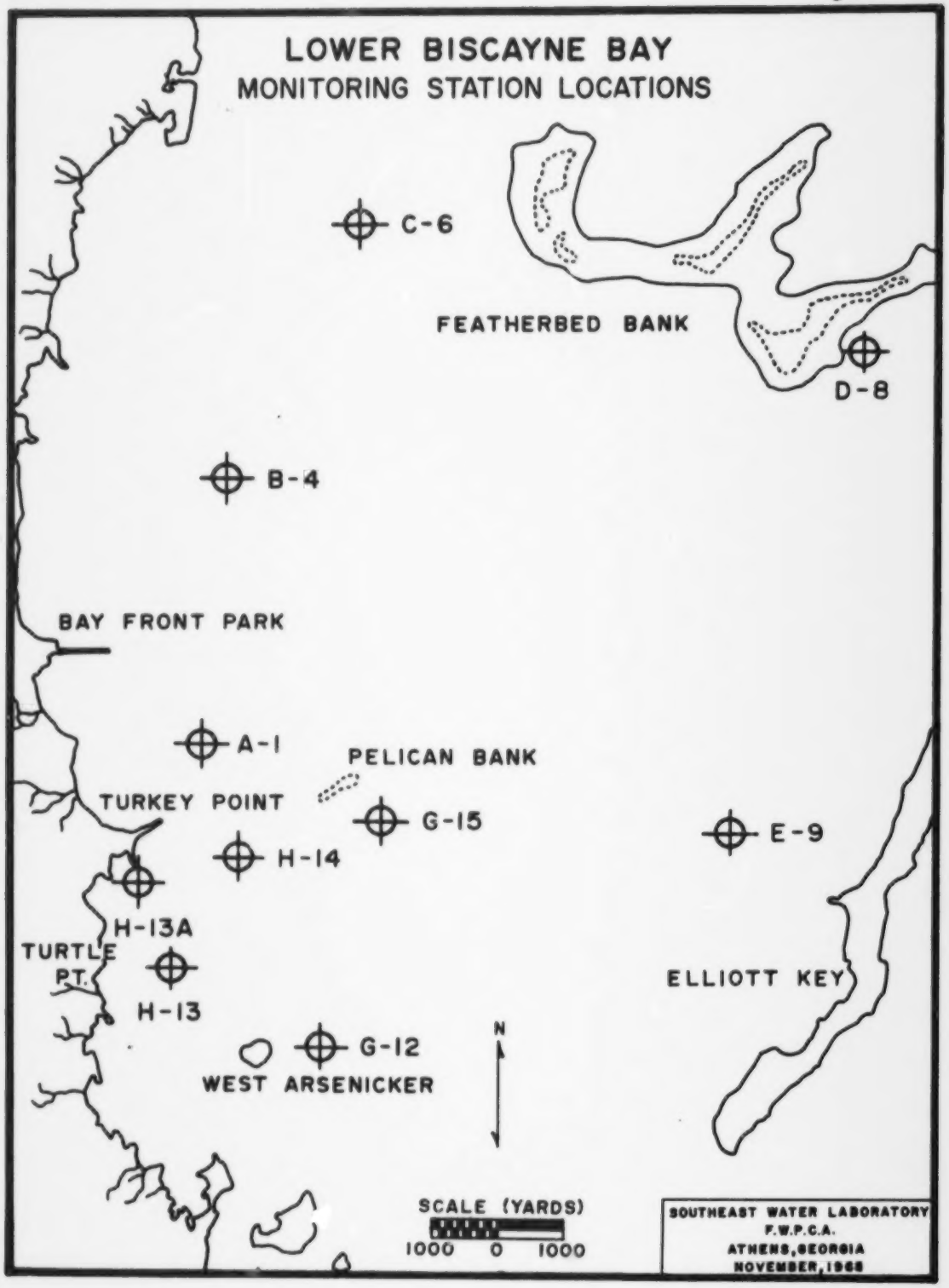
The thermographs were suspended approximately 14 inches under the water surface below a 12" x 12" x 17" block of styrofoam which was anchored by means of stainless steel cable to a 5/8" steel rod driven into the bottom of the Bay.

Eighteen station locations were originally selected by dividing the bay into six quadrants and systematically, with a random start, placing three monitors in each quadrant. However, because of apparent theft in the early phases of the study, the above design was abandoned. Sufficient data for analysis were obtained only from the ten stations shown on Figure 3. Station H13A had two monitors; one at a depth of 14 inches and one approximately one foot from the bottom.

Transect Studies

In late July and August intensive studies of water temperature in the area around Turkey Point were conducted. Transects extending

Figure 3


LOWER BISCAYNE BAY
MONITORING STATION LOCATIONS
C-6
FEATHERBED BANK
D-8
B-4
BAY FRONT PARK
A-1
PELICAN BANK
TURKEY POINT
G-15
E-9
H-14
H-13A
TURTLE PT.
H-13
ELLIOTT KEY
G-12
WEST ARSENICKER
N
SCALE (YARDS)
1000 0 1000
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1965

approximately perpendicular to the shoreline were established between Turtle Point and Homestead Bay Front Park. The transects for the July and August studies are shown in Figures 4 and 5, respectively. Vertical profiles of temperature were taken at 100 yard intervals along the transects. The transects in July were run with one boat and consequently to complete a series of temperature data at all transects required from one and one-half to three hours. In August five boats were used simultaneously and each transect was sampled hourly.

RESULTS

Monitor Studies

The monitoring stations at B4, C6 and E9 are believed to be representative of the range of background temperatures found in Biscayne Bay during the period of this study. They are sufficiently remote from Turkey Point that heated water from the effluent canals had no obvious effects on them (Figure 3). The above stations, referred to as the control stations, are used as a base for comparison with Station H13, H13A and H14 which are in sufficient proximity to Turkey Point to show effects of the effluent on bay temperature. Data from the other four stations are presented in Appendix B, Tables B-20 through B-28.

In April with one conventional unit in operation, maximum daily water temperature at the above six stations ranged from 81° - 83°F (Figure 6 and Appendix B, Table B-1). The station closest to Turkey Point (H13) exhibited the highest temperature; however, the differential was only one degree Fahrenheit and the effect, if any, of heated effluent was negligible.

Maximum Bay temperature recorded by the monitors was reached in

mid-August, 1968 (Figure 6 and Appendix B, Table B-1. At stations H13, H13A, and H14 the maximum temperatures ranged from 93° - 96°F, an increase of 3° to 9°F over the control stations (Figure 6).

The mean daily maximum temperatures for the period August 12 to August 23 at the control and affected stations were compared by analysis of variance (Table 4). The temperature differences between control and affected stations were found to be highly significant. Statistically this means that we can state, with a high probability of being correct (greater than 99%), that the differences in maximum temperatures during August (as shown in Figure 6) are true differences.

Two of the stations nearest Turkey Point (H13A and H14) had much higher daily fluctuations in temperature as compared with the control stations (Figure 7 and Appendix B, Table B-2). During the two week period when maximum temperatures were reached (August 13 - August 26) the maximum daily range in temperature (i.e., the difference between the daily maximum and minimum temperature) at the control stations was 5°F at station B4. Stations C6 and E9 had maximum daily fluctuations of 4°F and 3°F, respectively. Stations H13A and H14 had maximum daily fluctuations of 9°F and 7°F, respectively.

The transect data show that movement of heated water from the mouth of the lower canal is invariably north to northeast around Turkey Point. Station H13 lies in a southeasterly direction from the mouth of the canal, out of the path of the heated discharge, and does not exhibit the high daily fluctuation in temperature observed at stations H13A and H14.

Maximum hourly rate of temperature change was found at monitor stations H13A and H13 and amounted to 3.0°F/hour (Appendix B, Tables B-3 through B-19).

TABLE 4

ANALYSIS OF VARIANCE WITH SELECTED COMPARISON OF WATER TEMPERATURE AT STATIONS IN LOWER BISCAYNE BAY FOR THE PERIOD AUGUST 12 - AUGUST 23, 1968

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	F
Total	71	489.78		
Treatments	5	366.44	73.29	39.19**
B4, E9 & C6 vs H13, H13A & H14	1	245.68	245.68	131.38**
H13A vs H13 & H14	1	72.00	72.00	38.50**
B4 vs C6 & E9	1	51.68	51.68	27.64**
Error	66	123.33	1.87	

**Significant at 1% level.

Transect Studies

Results of the transect studies conducted in July and August are shown in text Figures 8 through 14 and Appendix A - Figures A1 through A23.

Maximum temperatures of 100°F were found near the mouth of the lower canal on July 28 and 29 (Figures 8 and 10). Water temperature at the mouth of the lower canal varied from 6° to 11°F higher than background temperature of the Bay and was generally from 9° - 11°F higher than background (Figures 8 through 14).

Movement of the heated effluent was invariably in a northeasterly direction around Turkey Point on the outgoing tide. Water temperatures 4° to 4.5°F over background temperature were found northeast of the tip of Turkey Point on several occasions.

The transects in August were run on an hourly basis and indicated a maximum rate of temperature change of as high as 4.5°F/hour at distances 850 yards offshore (Tables 5 and 6).

Vertically the water was generally well mixed with slight differences (usually 1° - 2°F) between surface and bottom temperatures. On several occasions the transect studies showed a temperature inversion, that is, the warmer water was near the bottom (Figure 15). A check of salinity in the top and bottom layers revealed that the water near the bottom had a higher salinity and was therefore more dense than the cooler surface water. There are insufficient data to evaluate the cause of this occasional increase in salinity. A reasonable hypothesis is that the increase of temperature across the condensers results in a high rate of evaporation in the canals with a subsequent increase in salinity of the effluent when it reaches the Bay.

During the study, a gross evaluation of the cooling effects of the discharge canals was made. Temperature was measured at several points in the canal (Figures 13 and 14) and compared to the temperature of the water being discharged to the Bay at the mouth of the lower canal. The maximum decrease in temperature ranged from 1.5°F to 3.5°F.

Figure 4

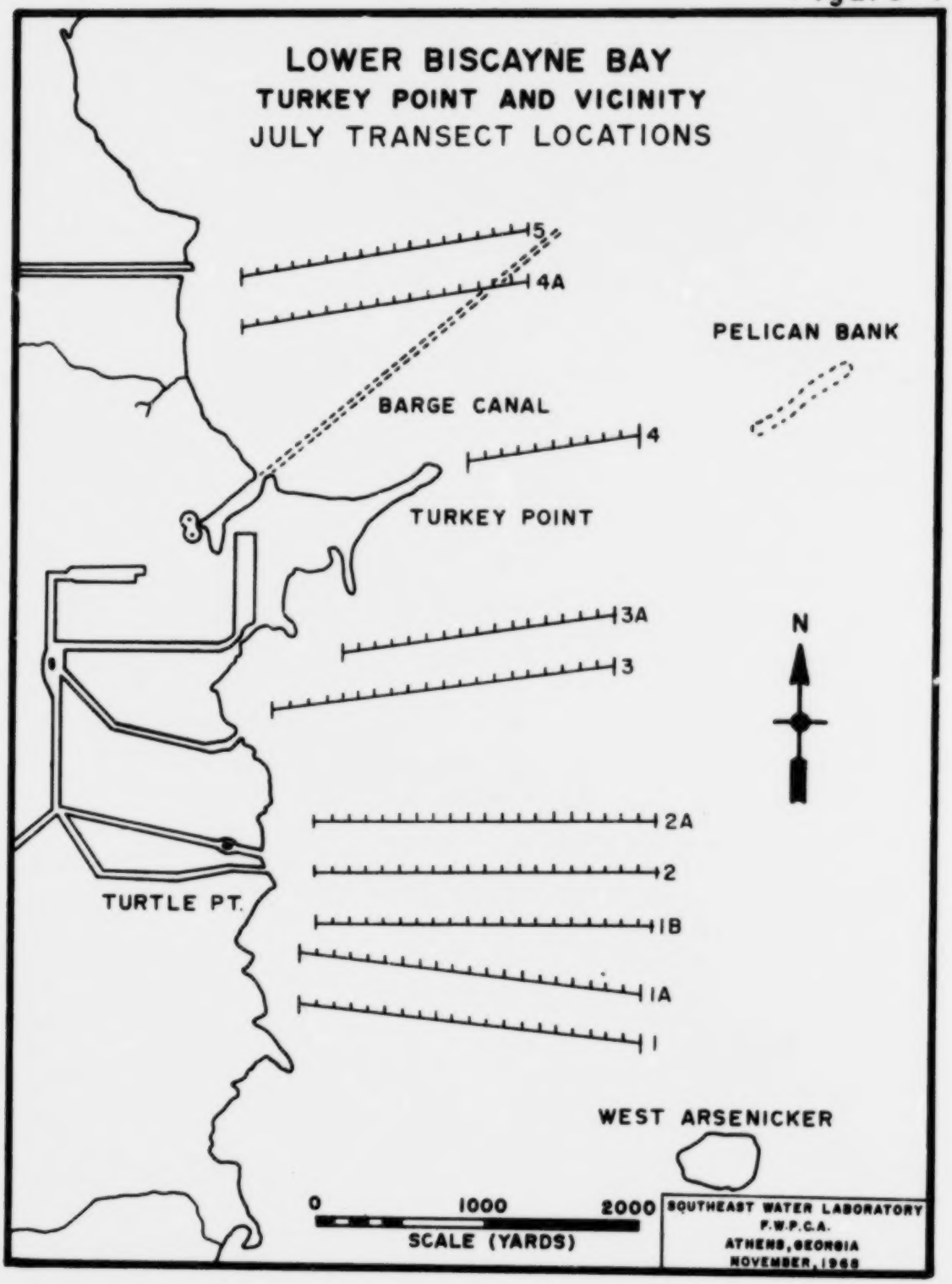

LOWER BISCAYNE BAY
TURKEY POINT AND VICINITY
JULY TRANSECT LOCATIONS
5
4A
PELICAN BANK
BARGE CANAL
4
TURKEY POINT
3A
3
N
2A
2
TURTLE PT.
1B
1A
1
WEST ARSENICKER
0
1000
2000
SCALE (YARDS)
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 5

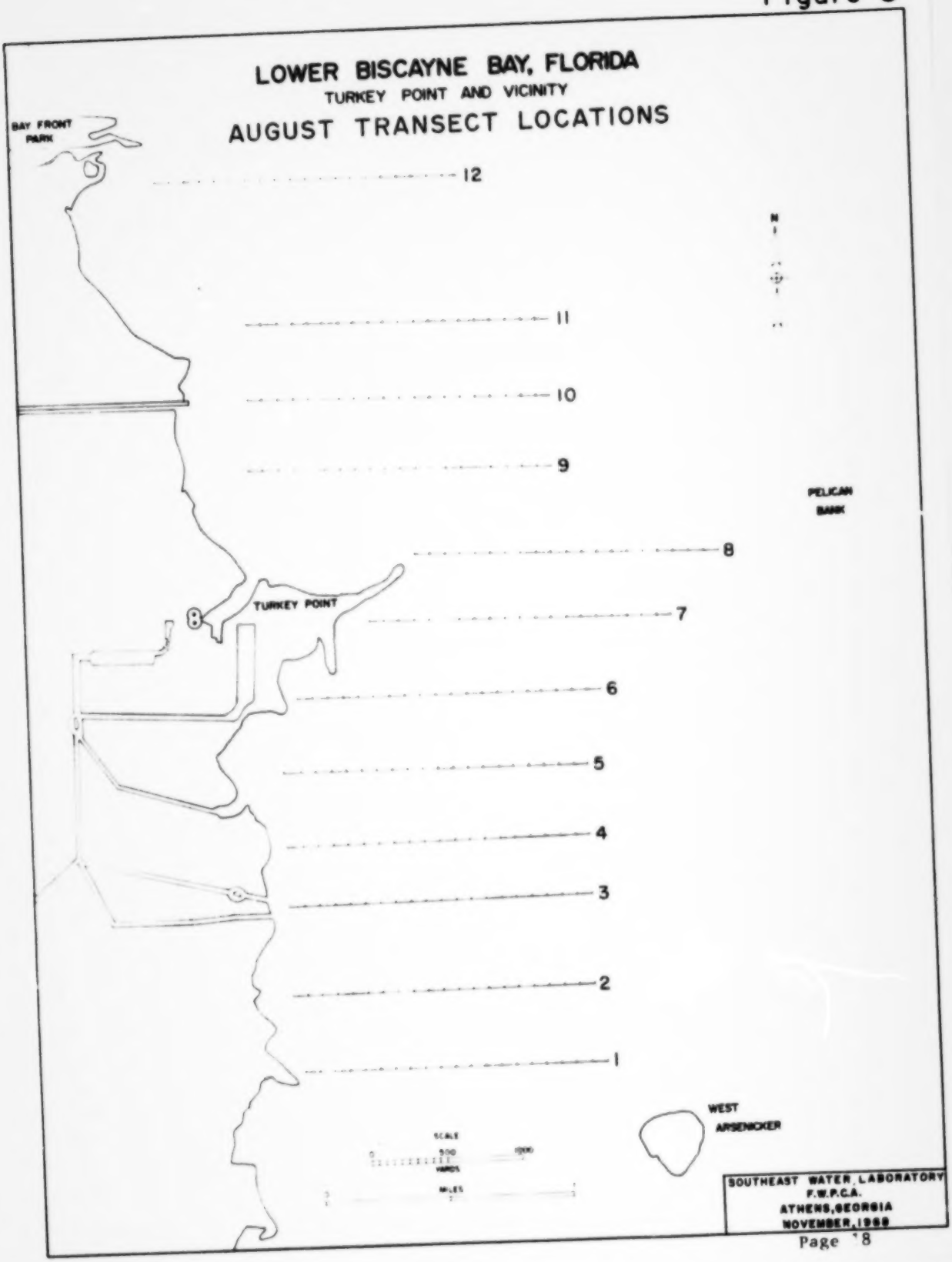
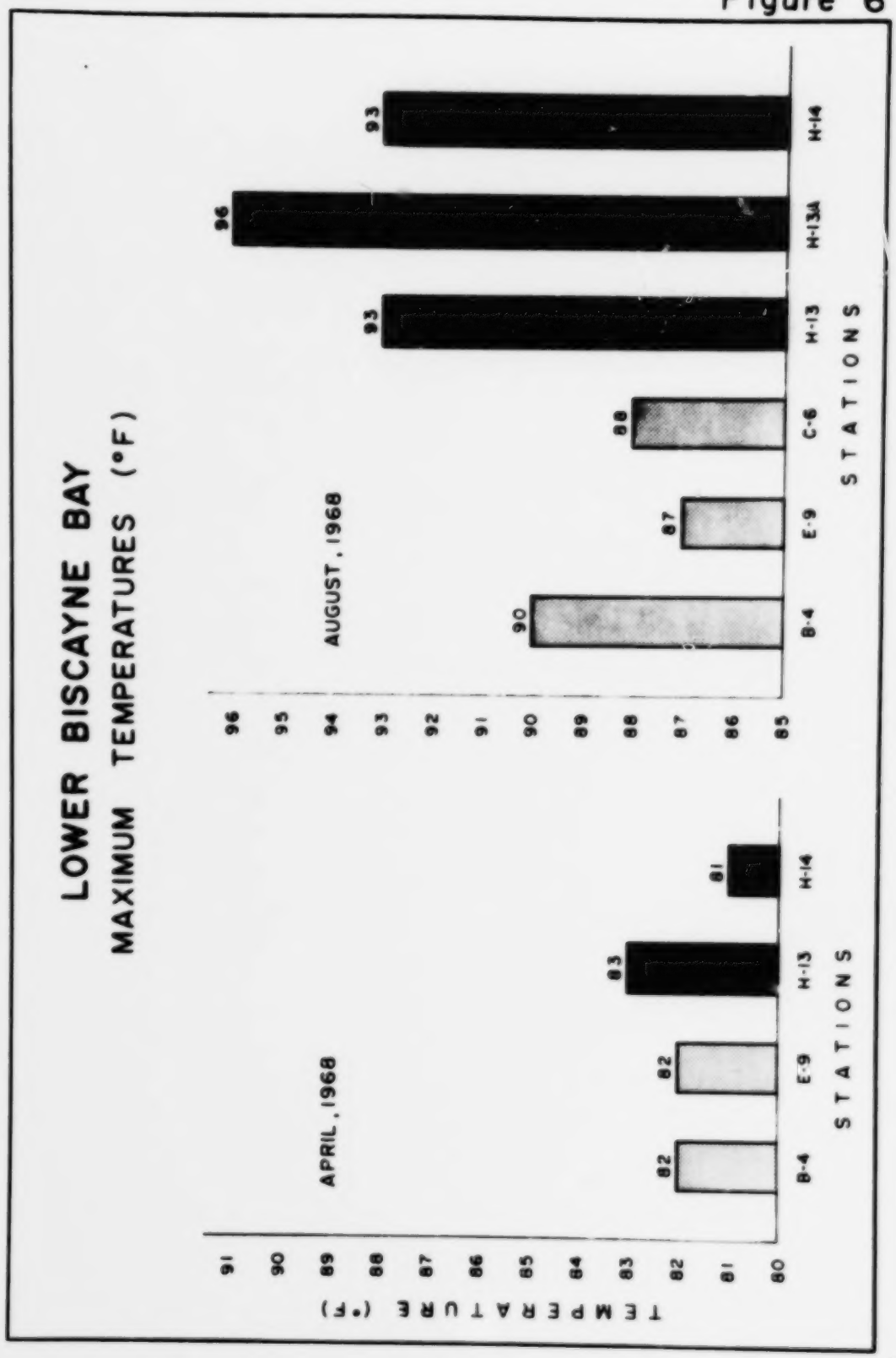

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
AUGUST TRANSECT LOCATIONS
BAY FRONT PARK
12
11
10
9
PELICAN BANK
8
TURKEY POINT
7
6
5
4
3
2
1
WEST ARSENICKER
SCALE
0
500
1000
YARDS
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 6


LOWER BISCAYNE BAY
MAXIMUM TEMPERATURES (°F)
TEMPERATURE (°F)
APRIL, 1968
AUGUST, 1968
STATIONS
B-4
E-9
H-13
H-14
C-6
H-13A
82
82
83
81
90
87
88
93
96
93

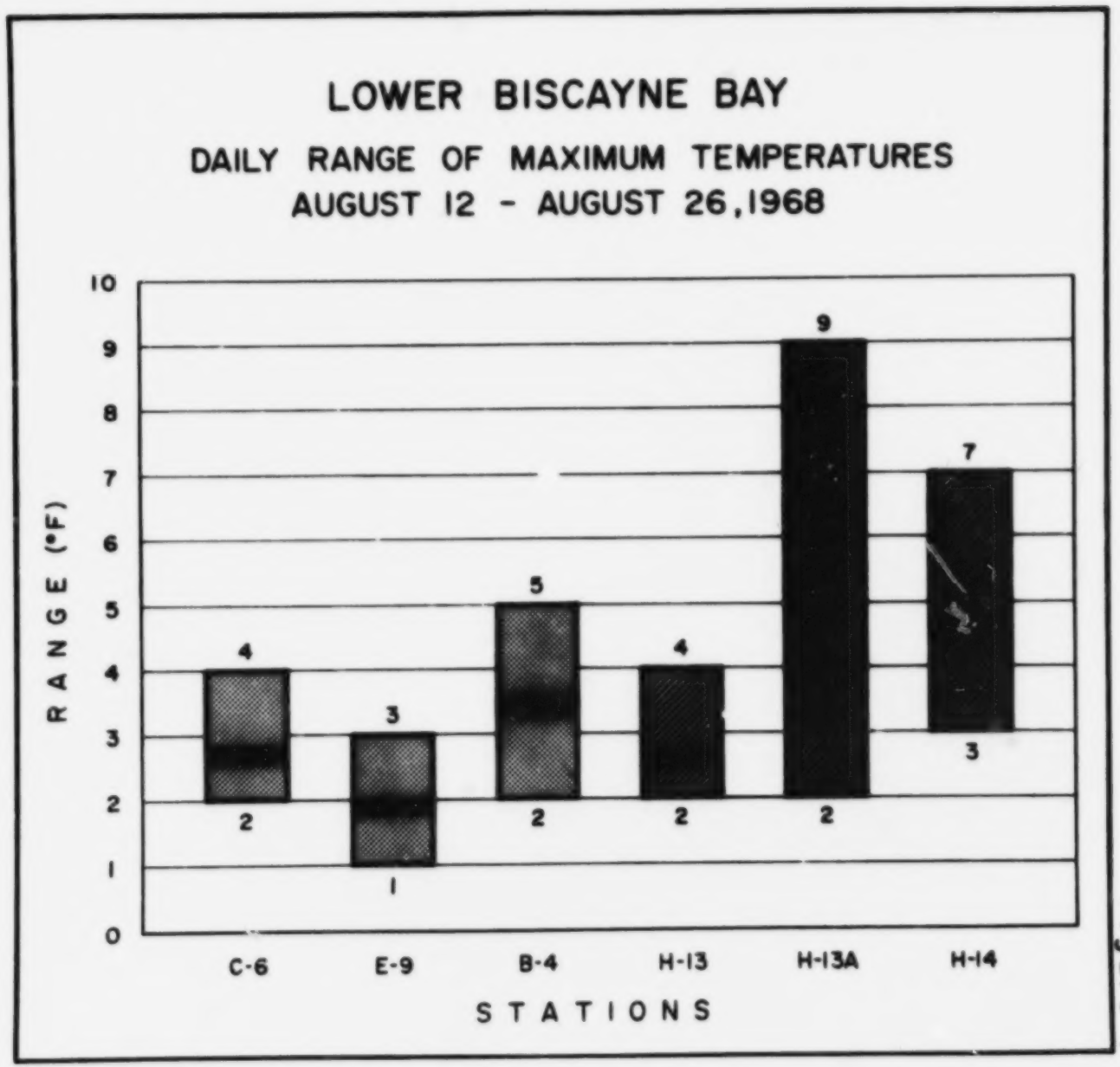

LOWER BISCAYNE BAY
DAILY RANGE OF MAXIMUM TEMPERATURES
AUGUST 12 - AUGUST 26,1968
RANGE (°F)
0
1
2
3
4
5
6
7
8
9
10
4
2
3
1
5
2
4
2
9
2
7
3
C-6
E-9
B-4
H-13
H-13A
H-14
STATIONS

Figure 7

TIME INTERVAL	POINT #1 °F	POINT #2 °F	POINT #3 °F	POINT #4 °F	POINT #5 °F	POINT #6 °F	POINT #7 °F	POINT #8 °F
0930-1030	2.7	0.9	0.9	0	0	1.8	0	2.7
1030-1130	0.9	0	0	0.9	3.6	0.9	1.8	1.8
1300-1400	0.7	0	0.4	0.4	1.1	0.7	0.7	1.1
1400-1500	1.8	0	0	0.9	1.8	3.6	4.5	4.5
1500-1600	1.8	1.8	0	0.9	0	0.9	0.9	1.8
1600-1700	1.8	0	0.9	0.9	0.9	1.8	0.9	0

TABLE 5

TEMPERATURE CHANGE (°F PER HOUR) AT SUCCESSIVE POINTS 100 YARDS APART ALONG TRANSECT NUMBER 3 ON AUGUST 26, 1968
(POINT #1 APPROXIMATELY 150 YARDS OFFSHORE)

TIME INTERVAL	POINT #1 °F	POINT #2 °F	POINT #3 °F	POINT #4 °F	POINT #5 °F	POINT #6 °F	POINT #7 °F	POINT #8 °F
0930-1030	0.9	0.9	0.9	0	0	2.7	2.7	0.9
1030-1130	0.9	0	0	0.9	3.6	0.9	1.9	1.8
1300-1400	0.7	0	0.2	0.4	1.1	0.7	0.7	0.7
1400-1500	1.8	0	0	0.9	1.8	3.6	4.5	4.5
1500-1600	1.8	1.8	1.8	0.9	0	0.9	0.9	1.8
1600-1700	1.8	0	0.9	0.9	0.9	1.8	0.9	1.8

TABLE 6

TEMPERATURE CHANGE (°F PER HOUR) AT SUCCESSIVE POINTS 100 YARDS APART ALONG TRANSECT NUMBER 3 ON AUGUST 26, 1968 (POINT #1 APPROXIMATELY 150 YARDS OFFSHORE)

Figure 8

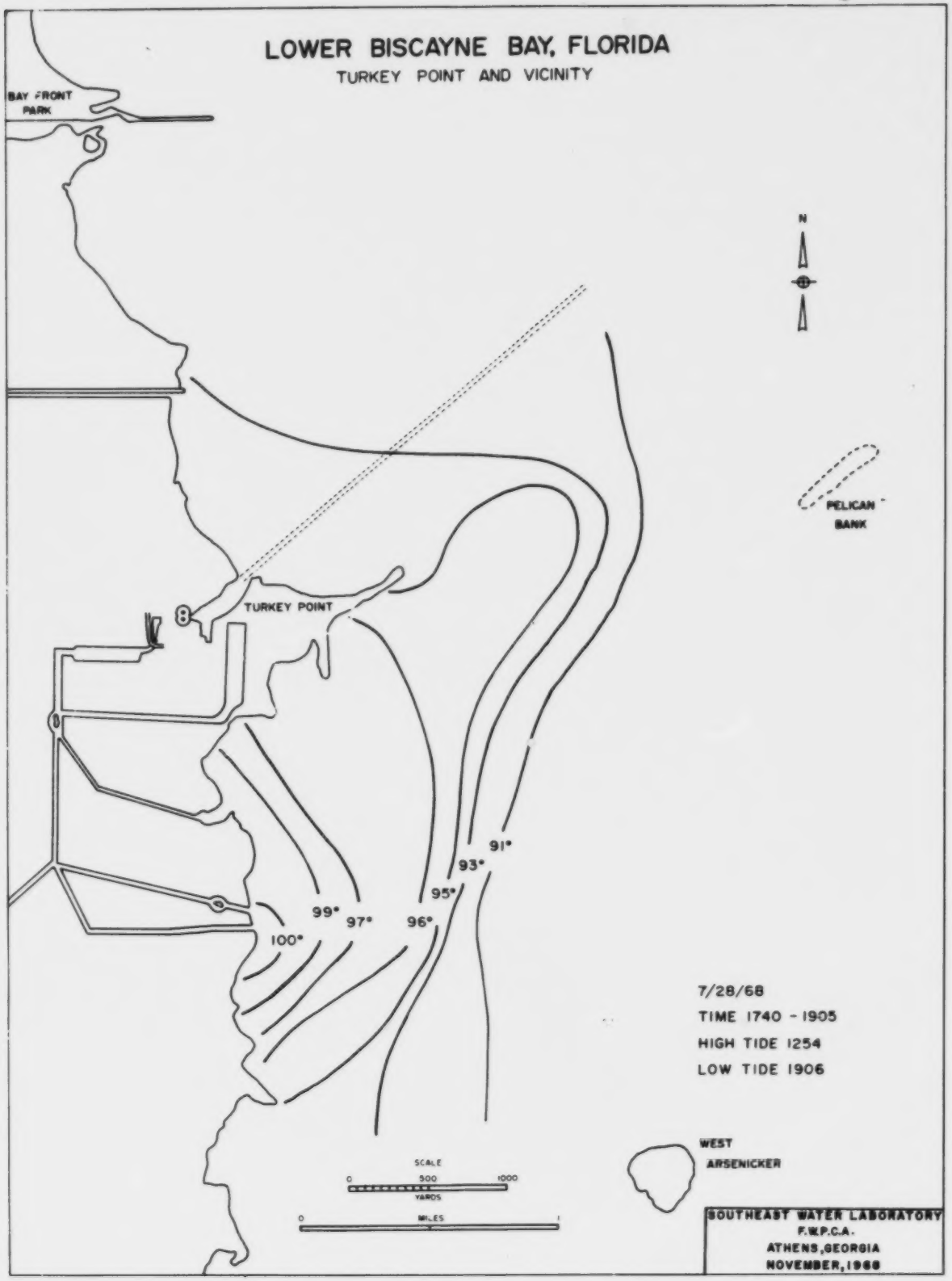

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
91°
93°
95°
96°
97°
99°
100°
7/28/68
TIME 1740 - 1905
HIGH TIDE 1254
LOW TIDE 1906
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 9

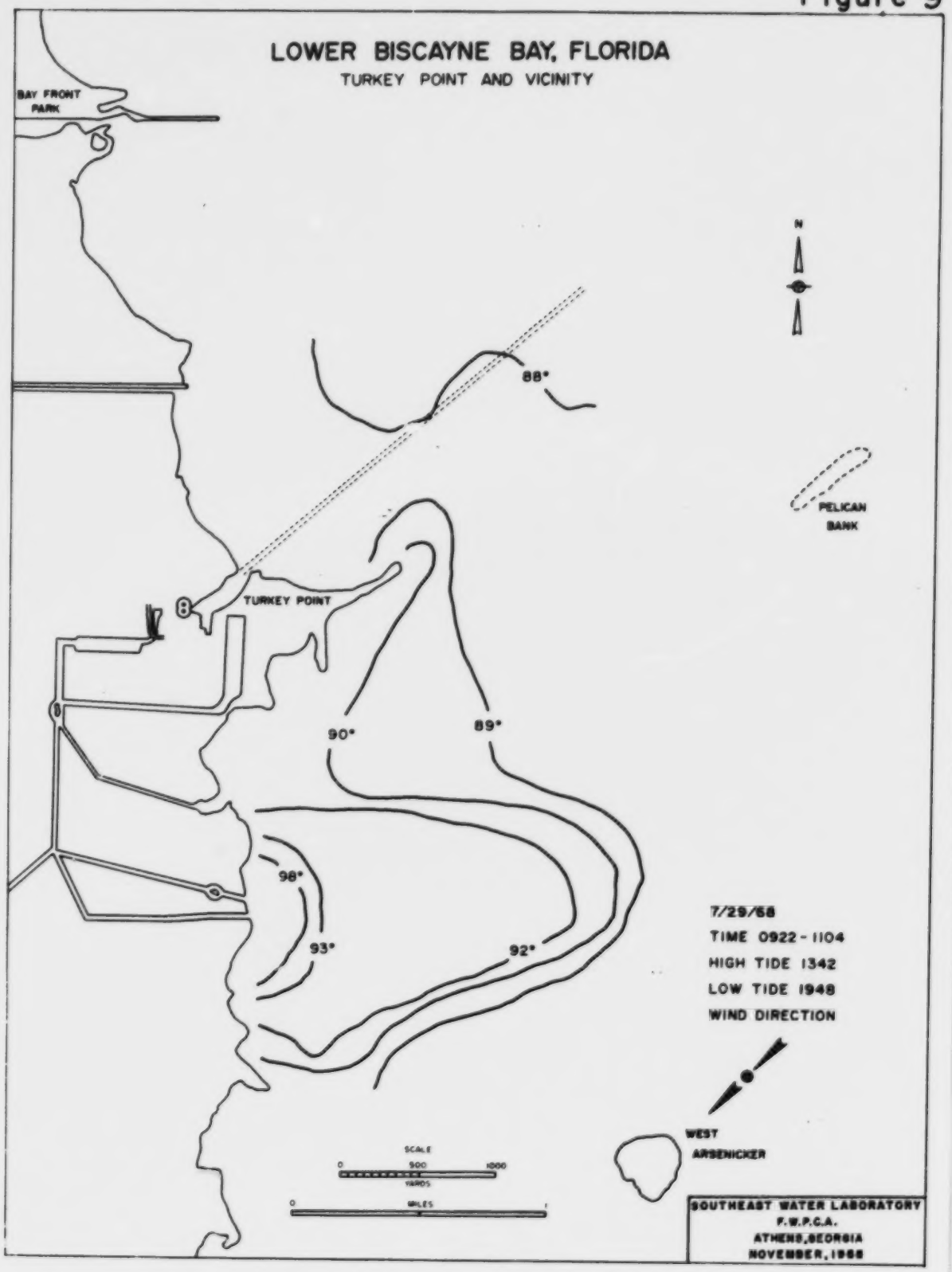

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
PELICAN BANK
TURKEY POINT
90°
89°
98°
93°
92°
7/29/68
TIME 0922 - 1104
HIGH TIDE 1342
LOW TIDE 1948
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 10

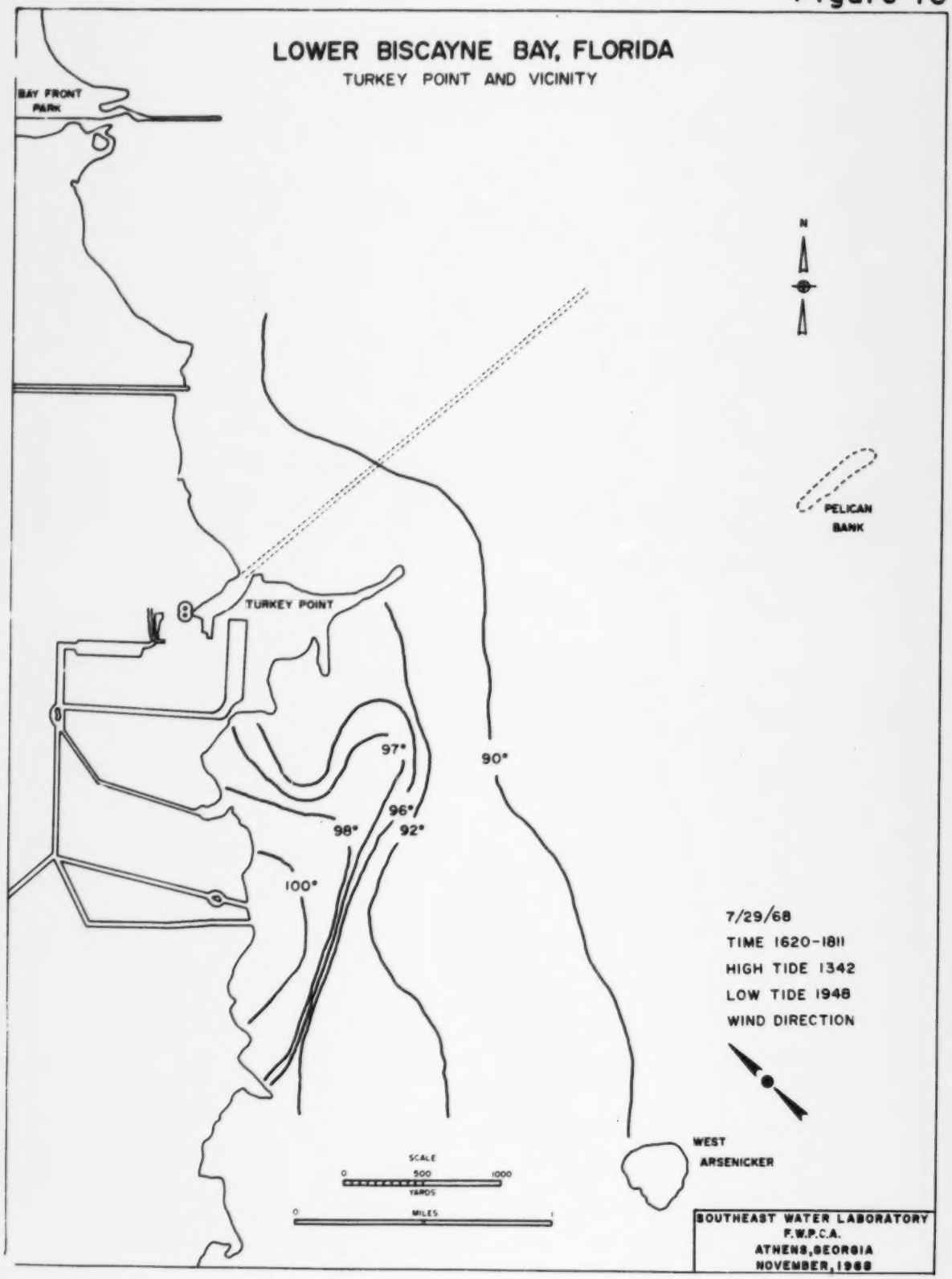

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
97°
90°
96°
98°
92°
100°
7/29/68
TIME 1620-1811
HIGH TIDE 1342
LOW TIDE 1948
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 11

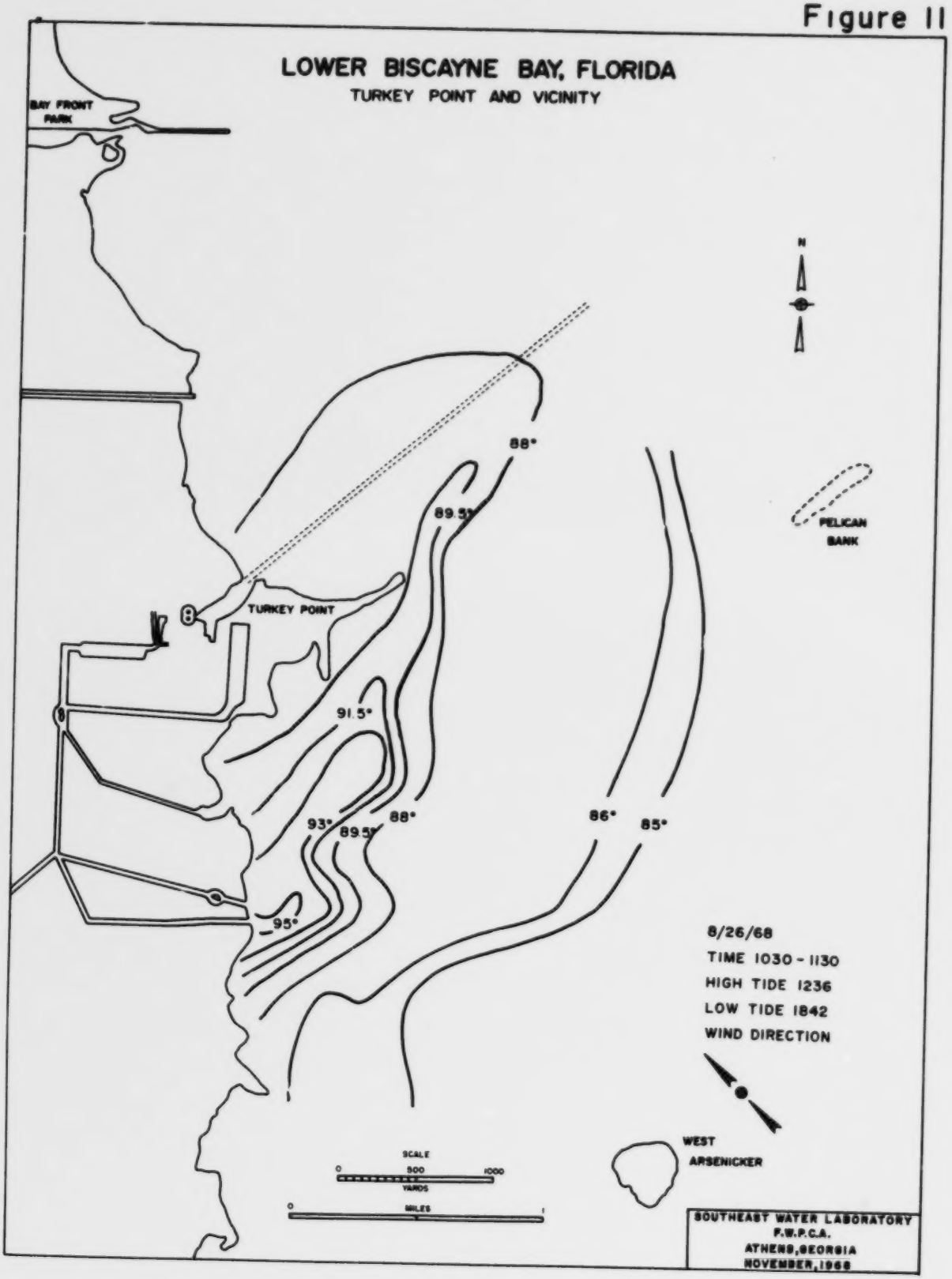

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
89.5°
PELICAN BANK
TURKEY POINT
91.5°
93°
89.5°
88°
86°
85°
95°
8/26/68
TIME 1030 - 1130
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 12

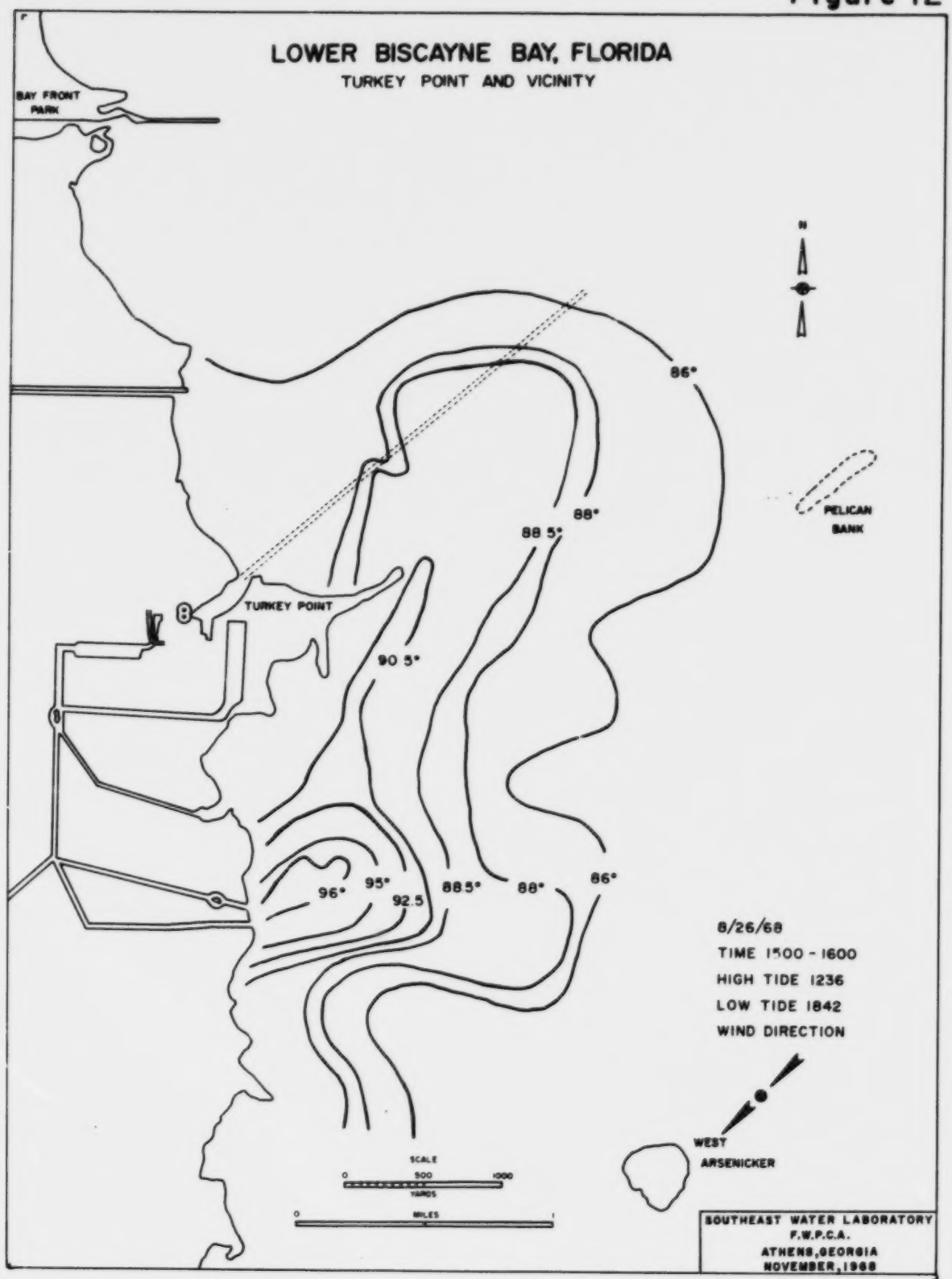

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
86°
88°
88.5°
PELICAN BANK
TURKEY POINT
90.5°
96°
95°
92.5
88.5°
88°
86°
8/26/68
TIME 1500 - 1600
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 13

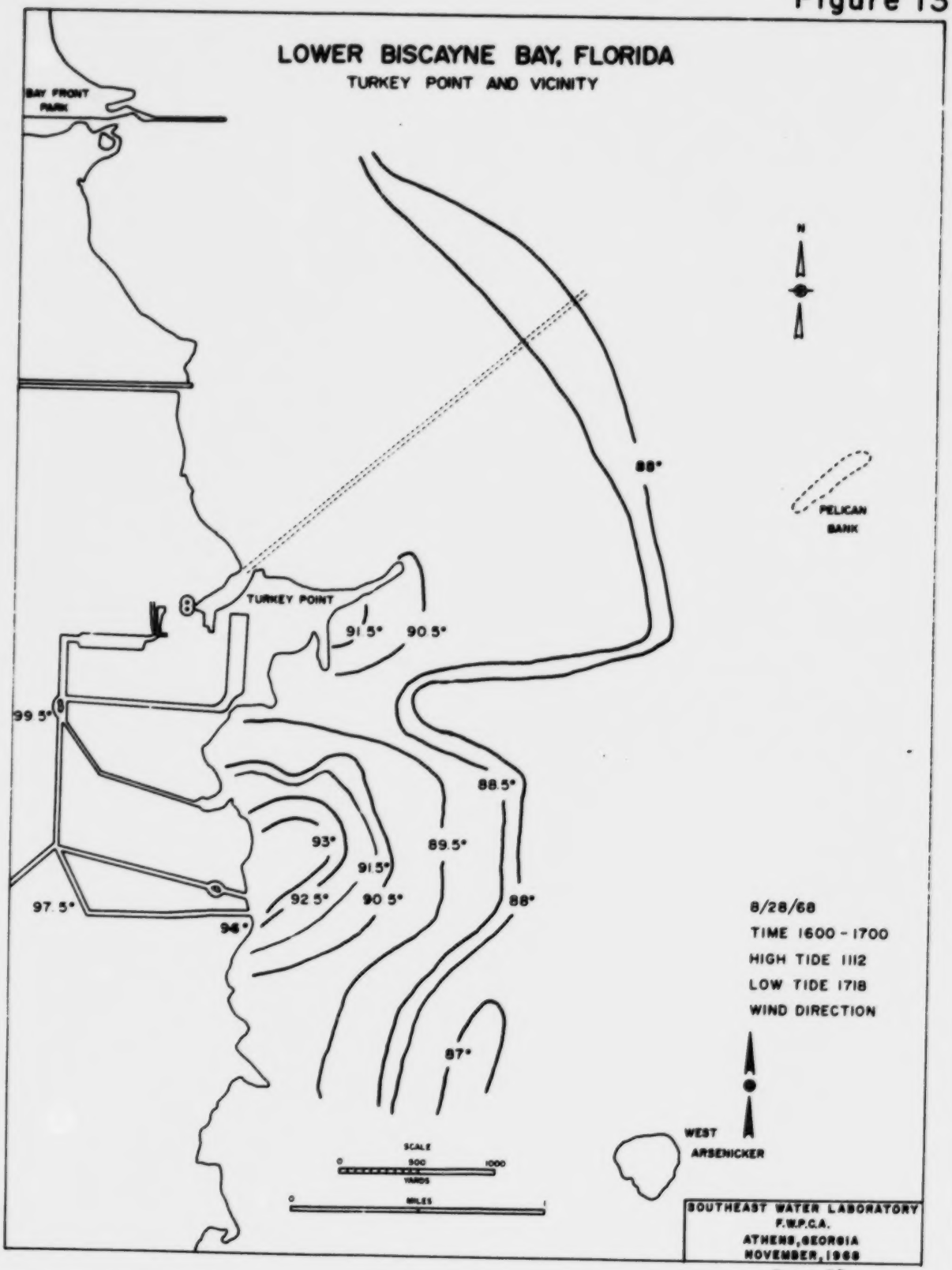
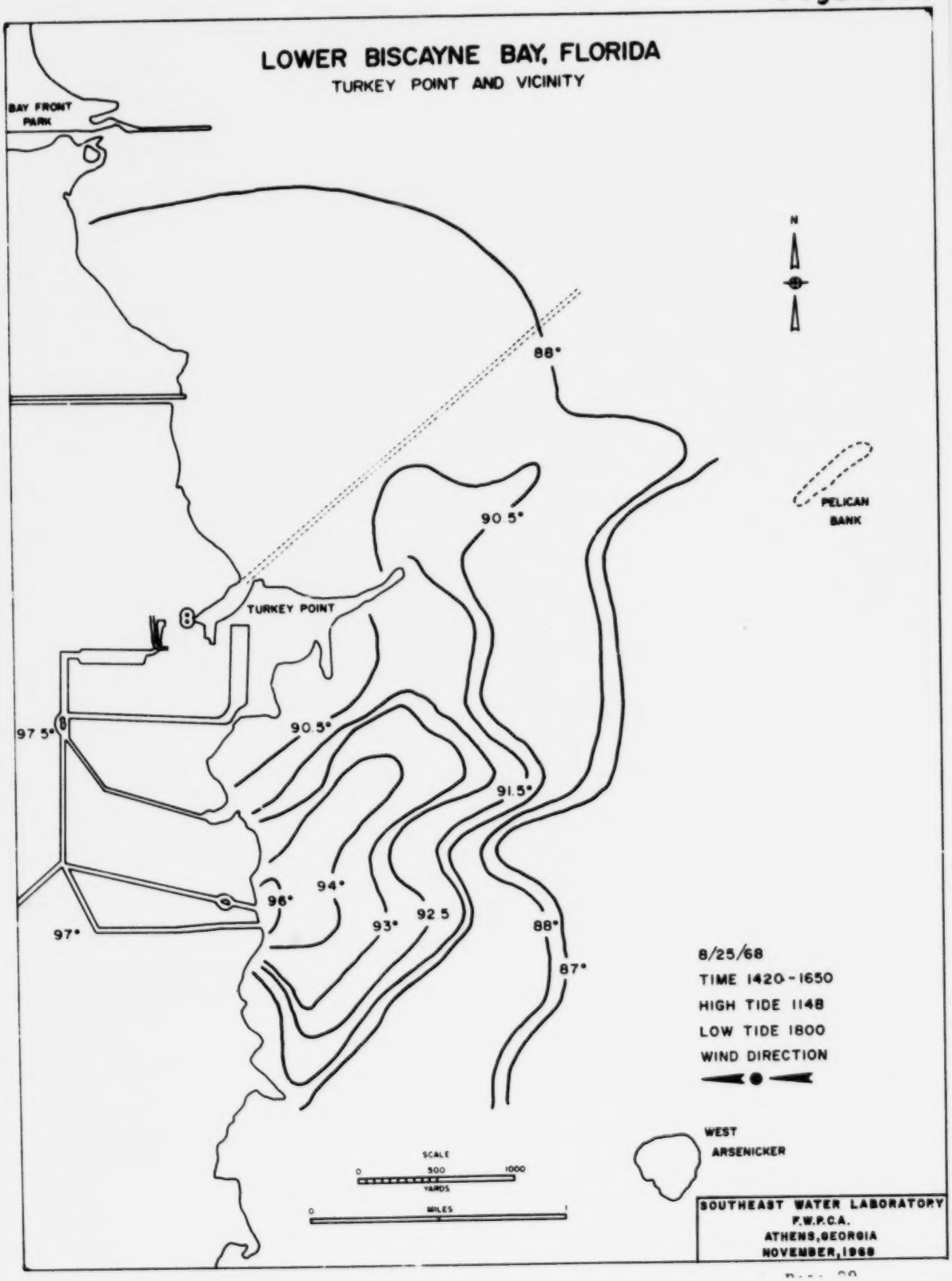

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
TURKEY POINT
PELICAN BANK
WEST ARSENICKER
88°
91.5°
90.5°
99.5°
88.5°
93°
91.5°
89.5°
92.5°
90.5°
88°
97.5°
96°
87°
N
8/28/68
TIME 1600 - 1700
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
SCALE
0
500
1000
YARDS
0
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure 14


LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
90.5°
PELICAN BANK
TURKEY POINT
97.5°
90.5°
91.5°
96°
94°
97°
93°
92.5
88°
87°
8/25/68
TIME 1420-1650
HIGH TIDE 1148
LOW TIDE 1800
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

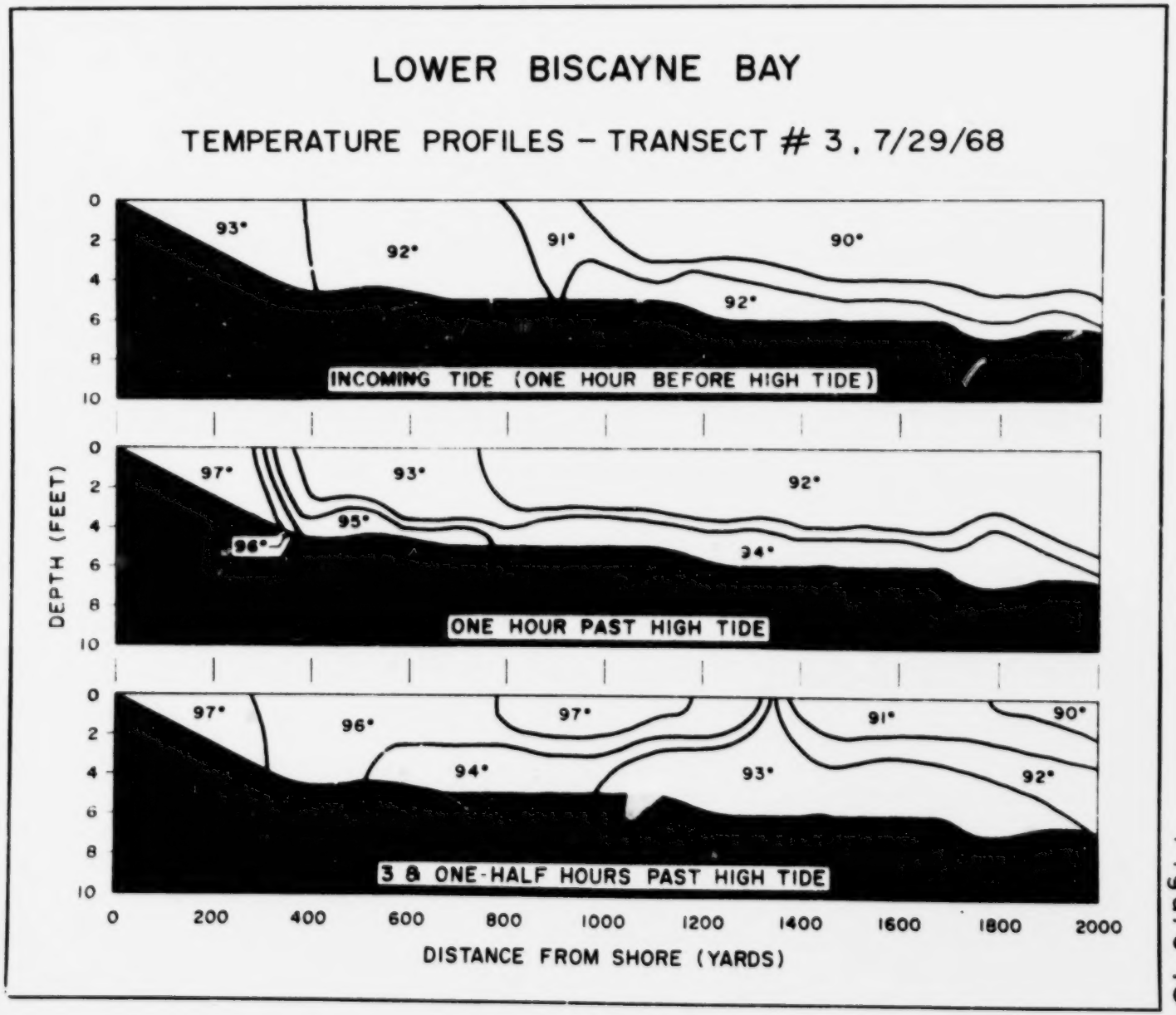

LOWER BISCAYNE BAY
TEMPERATURE PROFILES – TRANSECT # 3, 7/29/68
93°
92°
91°
90°
92°
INCOMING TIDE (ONE HOUR BEFORE HIGH TIDE)
97°
93°
92°
95°
96°
94°
ONE HOUR PAST HIGH TIDE
97°
96°
97°
91°
90°
94°
93°
92°
3 & ONE-HALF HOURS PAST HIGH TIDE
DEPTH (FEET)
0
2
4
6
8
10
0
200
400
600
800
1000
1200
1400
1600
1800
2000
DISTANCE FROM SHORE (YARDS)

Figure 15

APPENDIX A

ISOTHERMS DRAWN FROM TRANSECT DATA COLLECTED IN JULY AND AUGUST

Figure A I

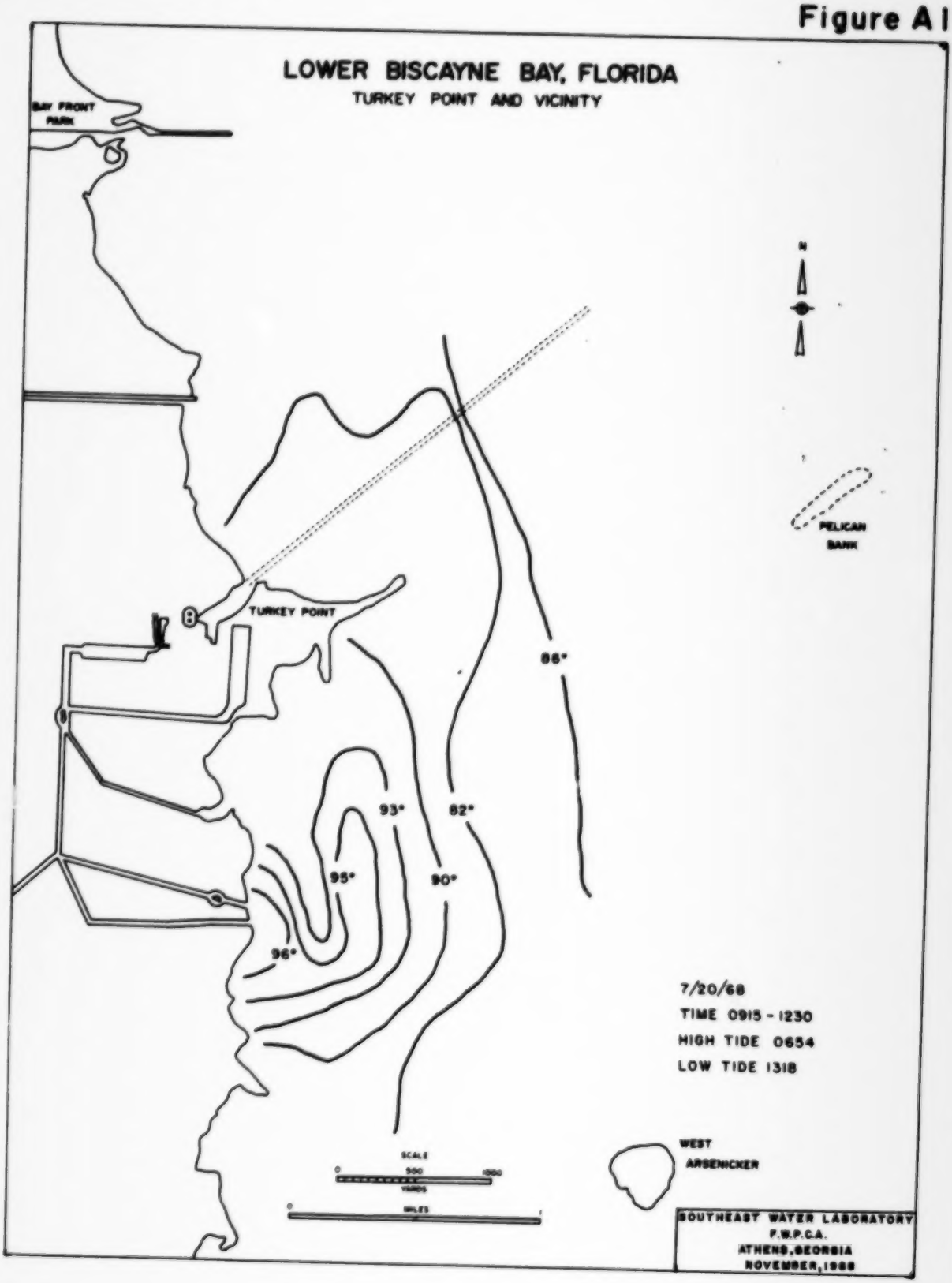

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
86°
93°
82°
95°
90°
96°
7/20/68
TIME 0915 - 1230
HIGH TIDE 0654
LOW TIDE 1318
SCALE
0
500
1000
YARDS
MILES
WEST ARSENICKER
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A2

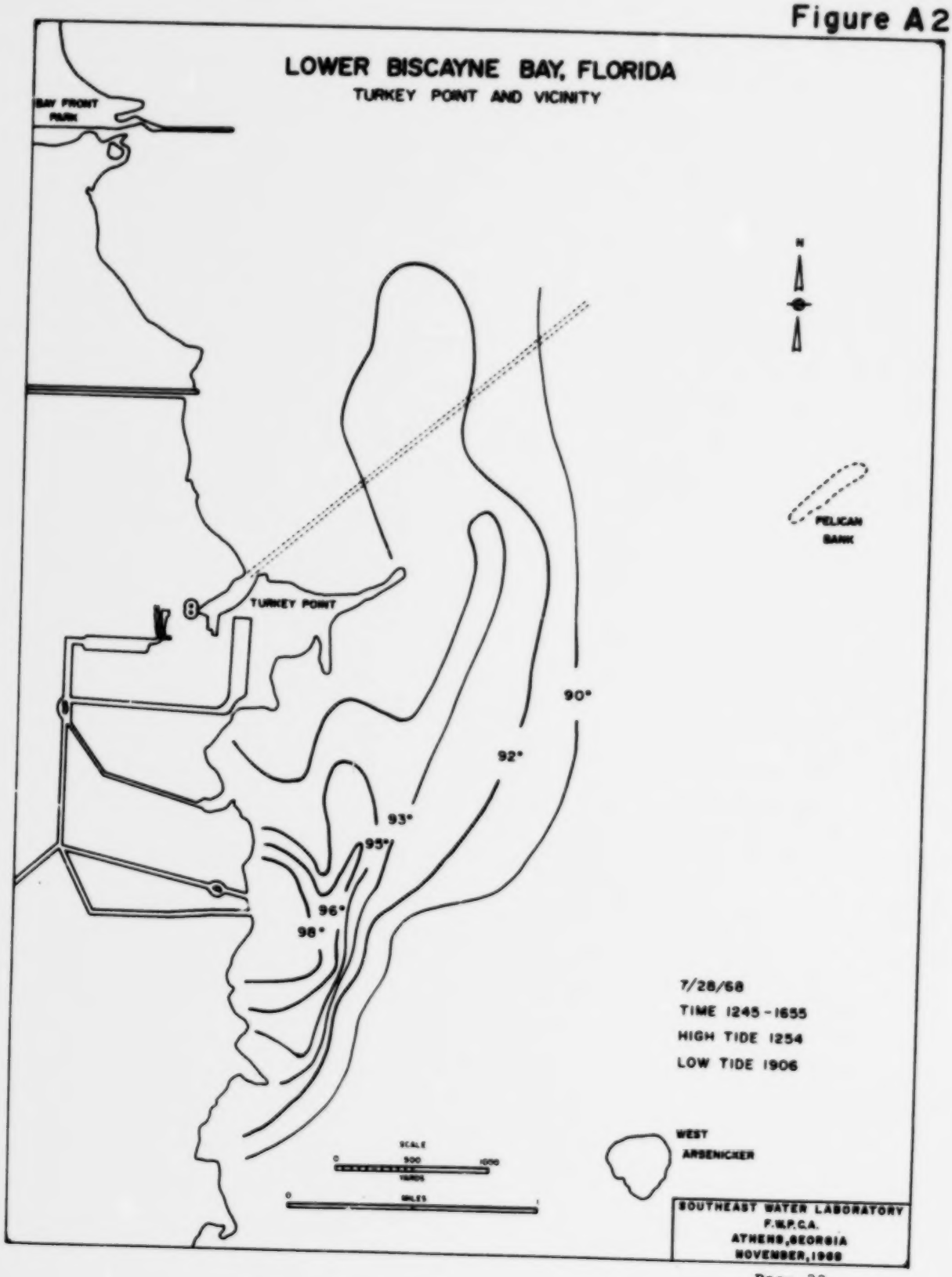

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
TURKEY POINT
PELICAN BANK
WEST ARSENICKER
90°
92°
93°
95°
96°
98°
7/28/68
TIME 1245 - 1655
HIGH TIDE 1254
LOW TIDE 1906
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A 3

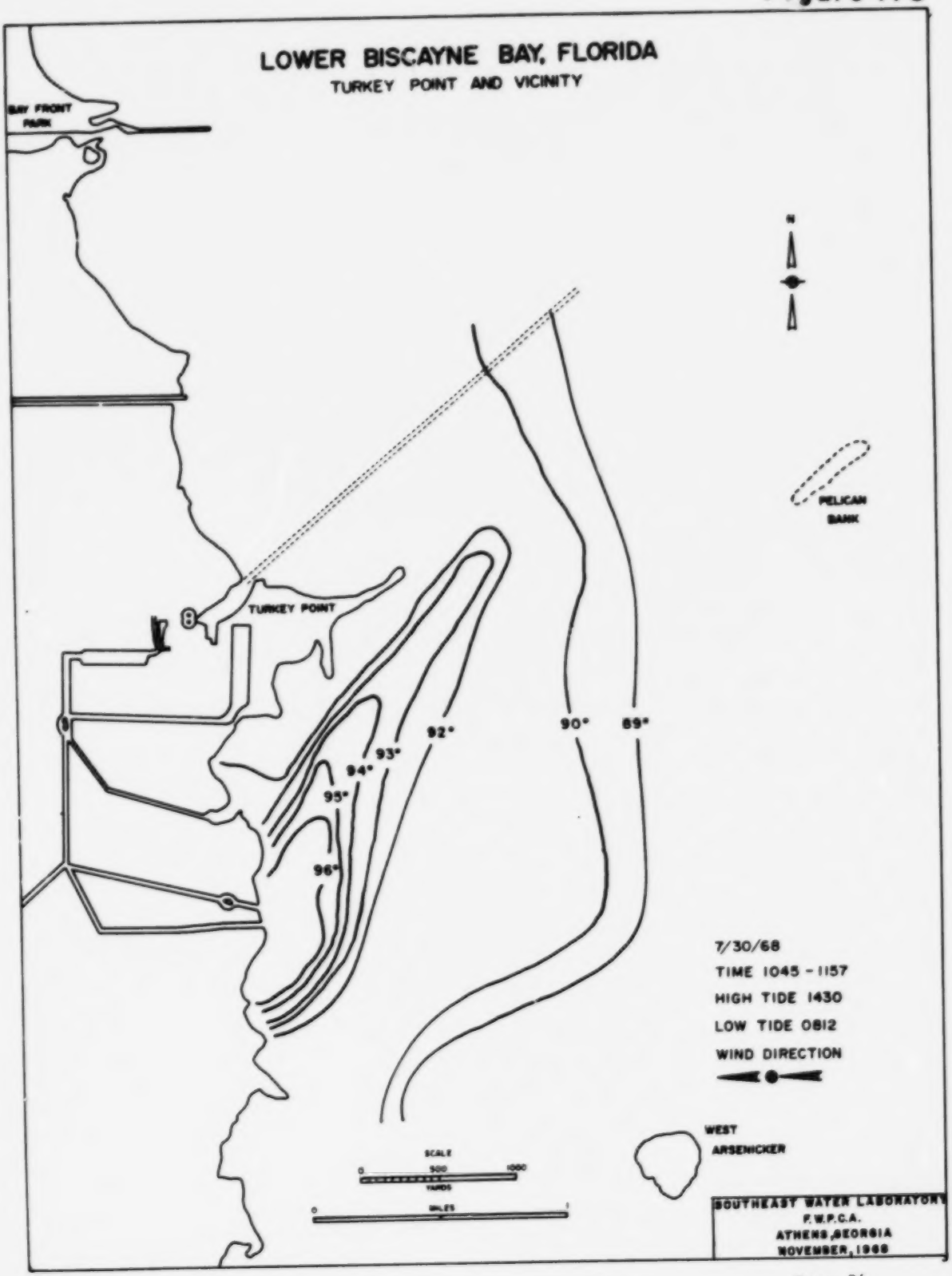

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
90°
89°
92°
93°
94°
95°
96°
7/30/68
TIME 1045 - 1157
HIGH TIDE 1430
LOW TIDE 0812
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A 4

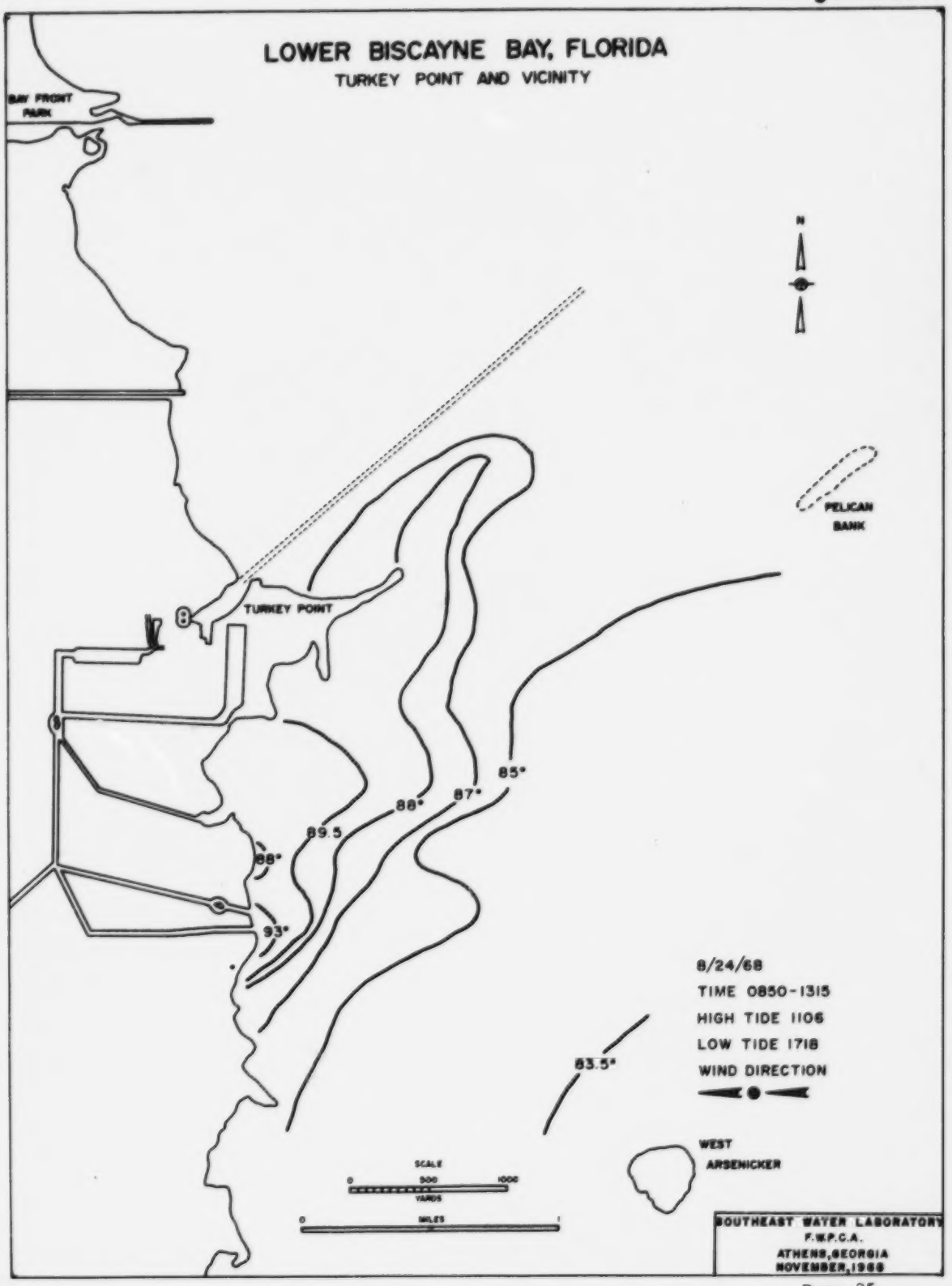

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
85°
87°
88°
89.5
88°
93°
83.5°
8/24/68
TIME 0850-1315
HIGH TIDE 1106
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A5

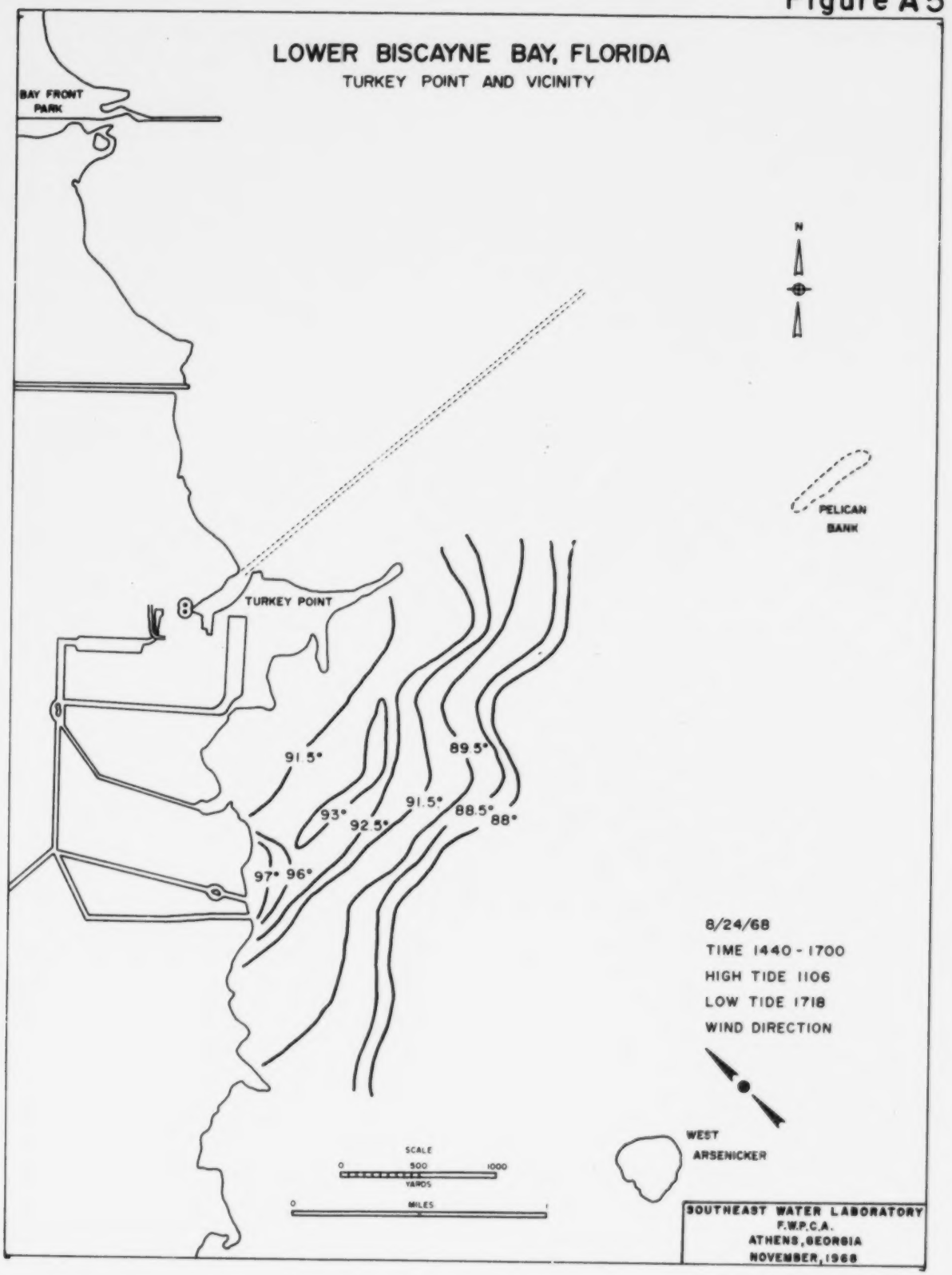

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
91.5°
89.5°
93°
92.5°
91.5°
88.5°
88°
97°
96°
8/24/68
TIME 1440 - 1700
HIGH TIDE 1106
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A6

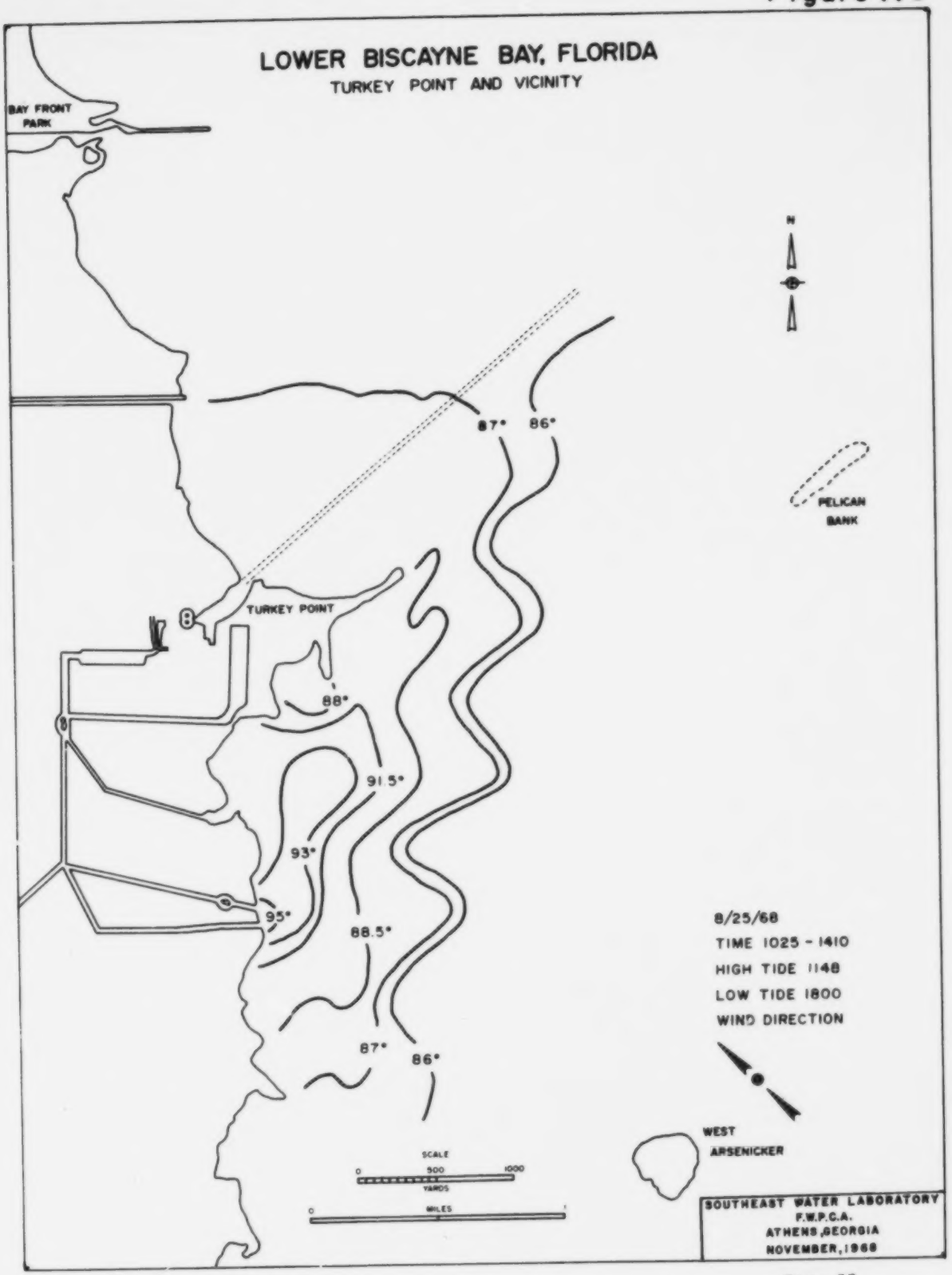

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
87°
86°
PELICAN BANK
TURKEY POINT
88°
91.5°
93°
95°
88.5°
87°
86°
8/25/68
TIME 1025 - 1410
HIGH TIDE 1148
LOW TIDE 1800
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A7

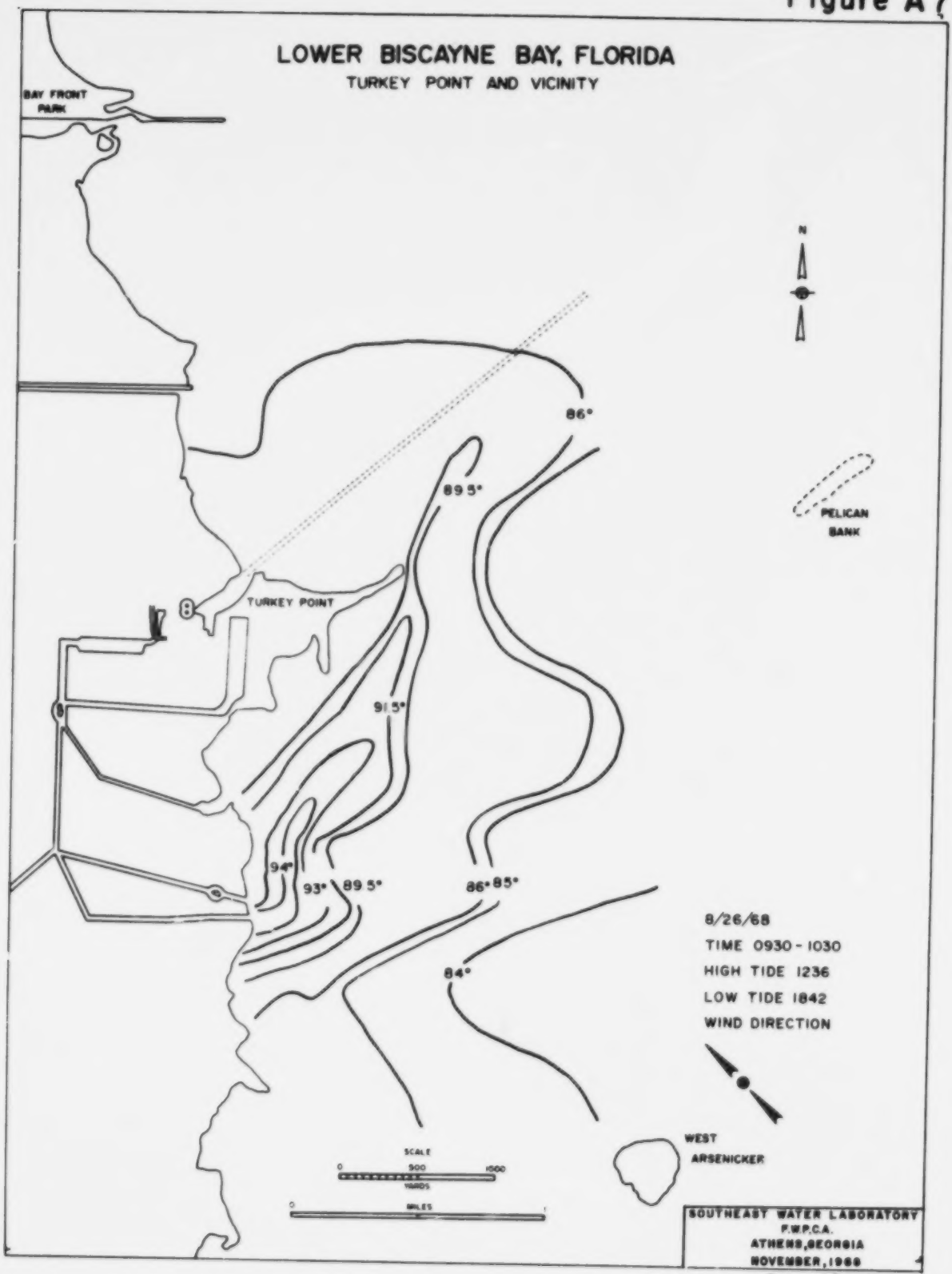

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
86°
89.5°
PELICAN BANK
TURKEY POINT
91.5°
94°
93°
89.5°
86°
85°
84°
8/26/68
TIME 0930 - 1030
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0
500
1000
YARDS
0
1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A8

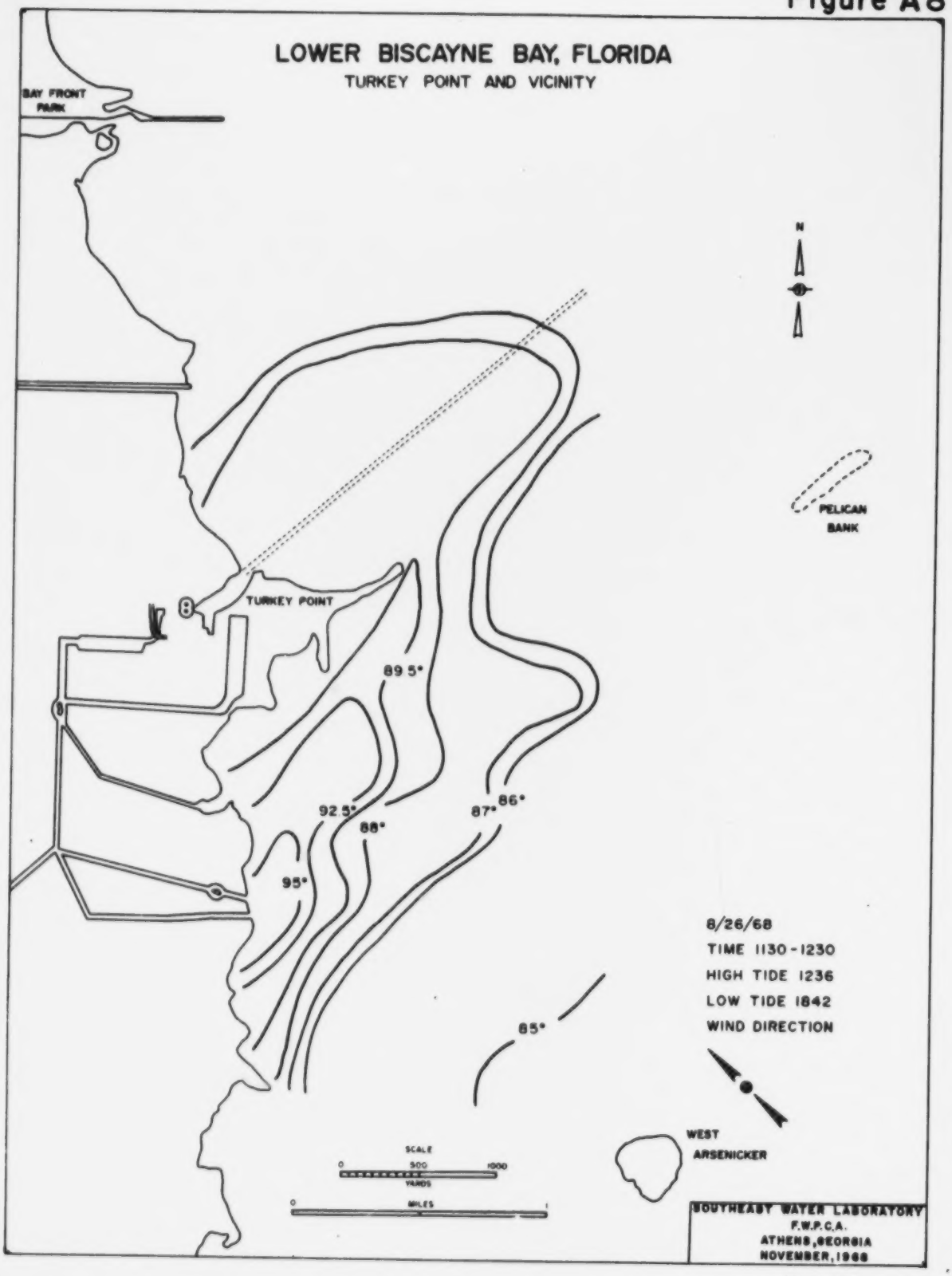

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
89.5°
92.5°
88°
87°
86°
95°
85°
8/26/68
TIME 1130-1230
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEASTERN WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A9

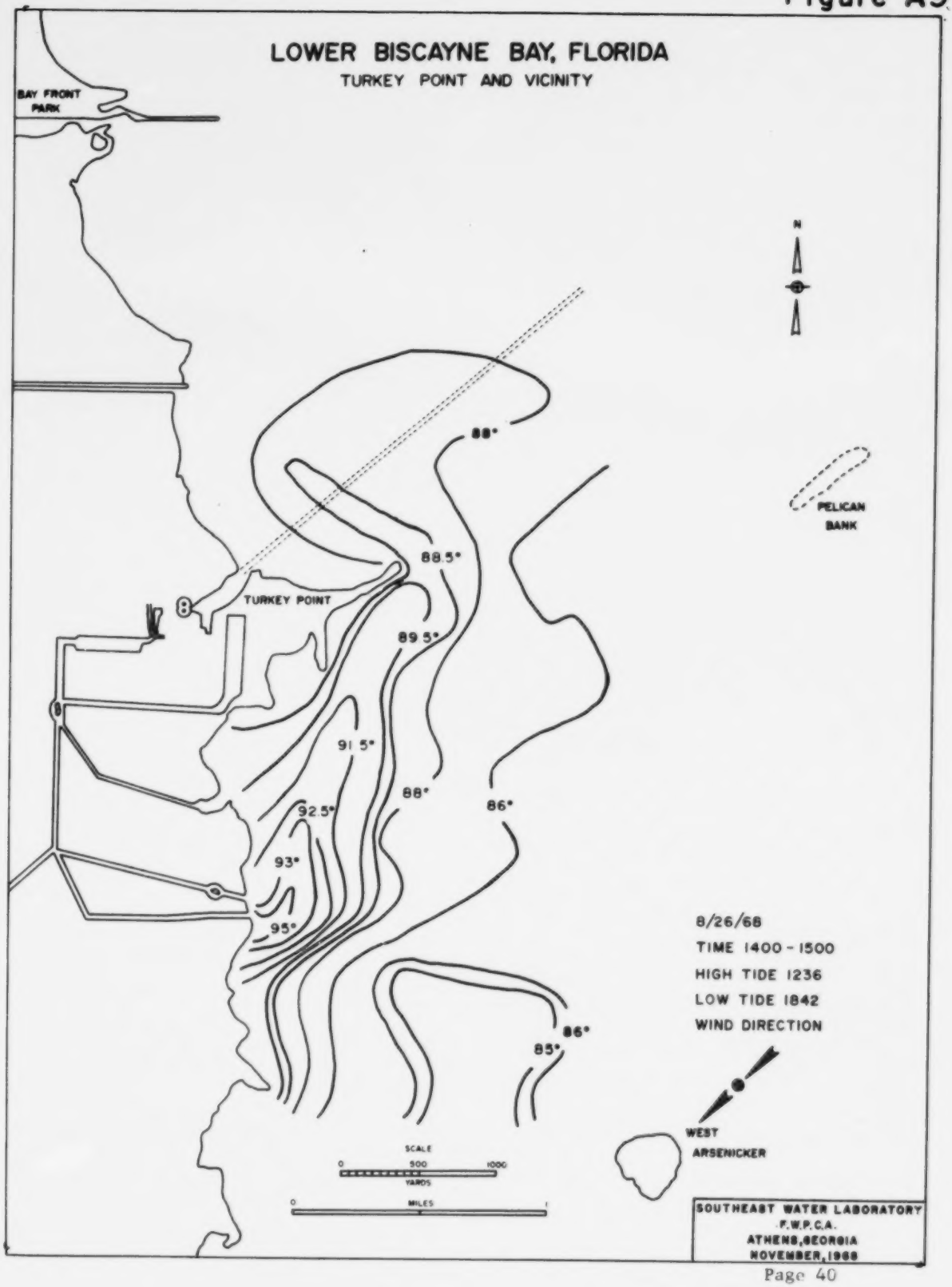

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
PELICAN BANK
88.5°
TURKEY POINT
89.5°
91.5°
88°
86°
92.5°
93°
95°
86°
85°
8/26/68
TIME 1400 - 1500
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A10

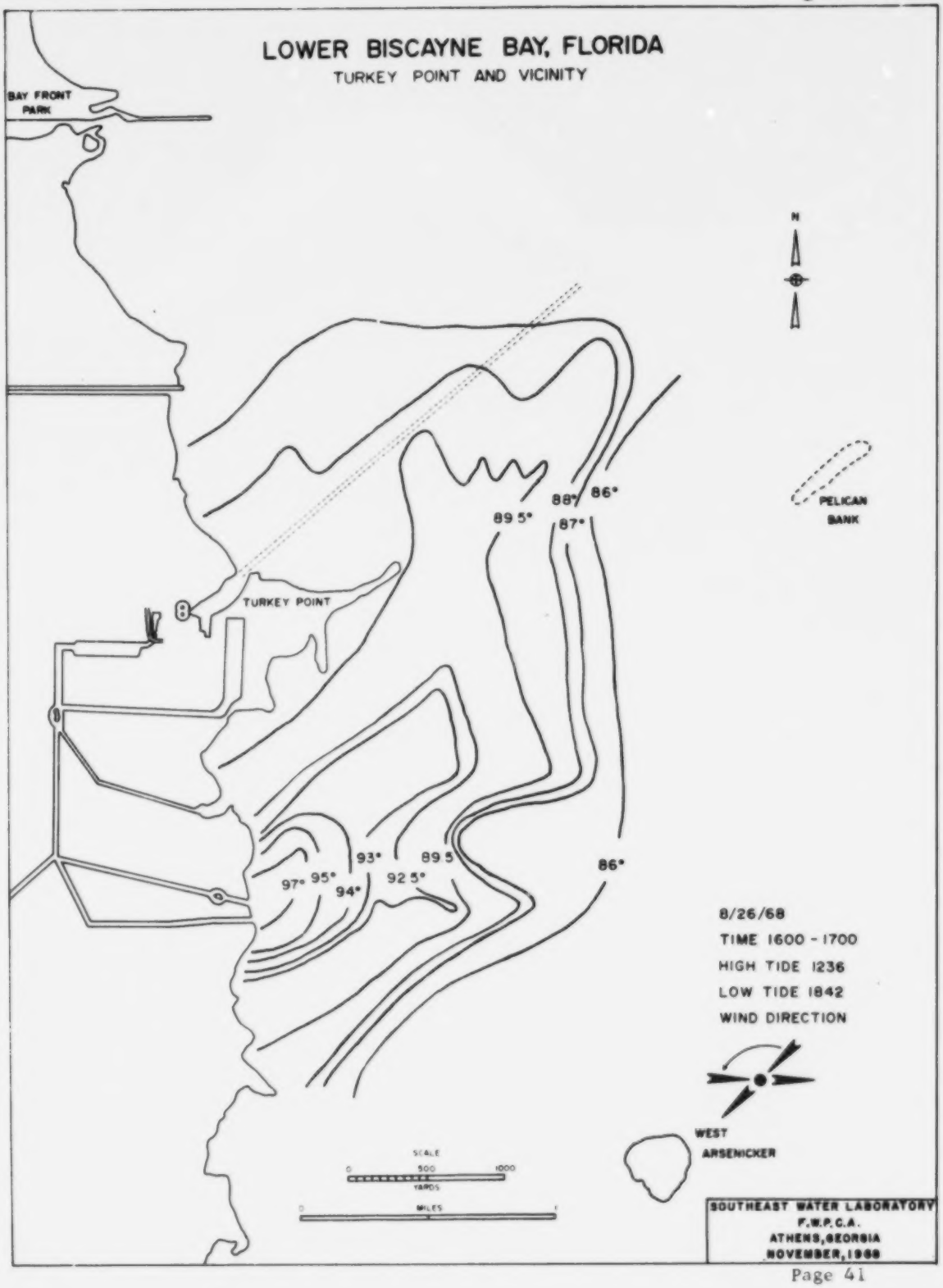

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
88°
86°
89.5°
87°
93°
89.5
97°
95°
94°
92.5°
86°
8/26/68
TIME 1600 - 1700
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A11

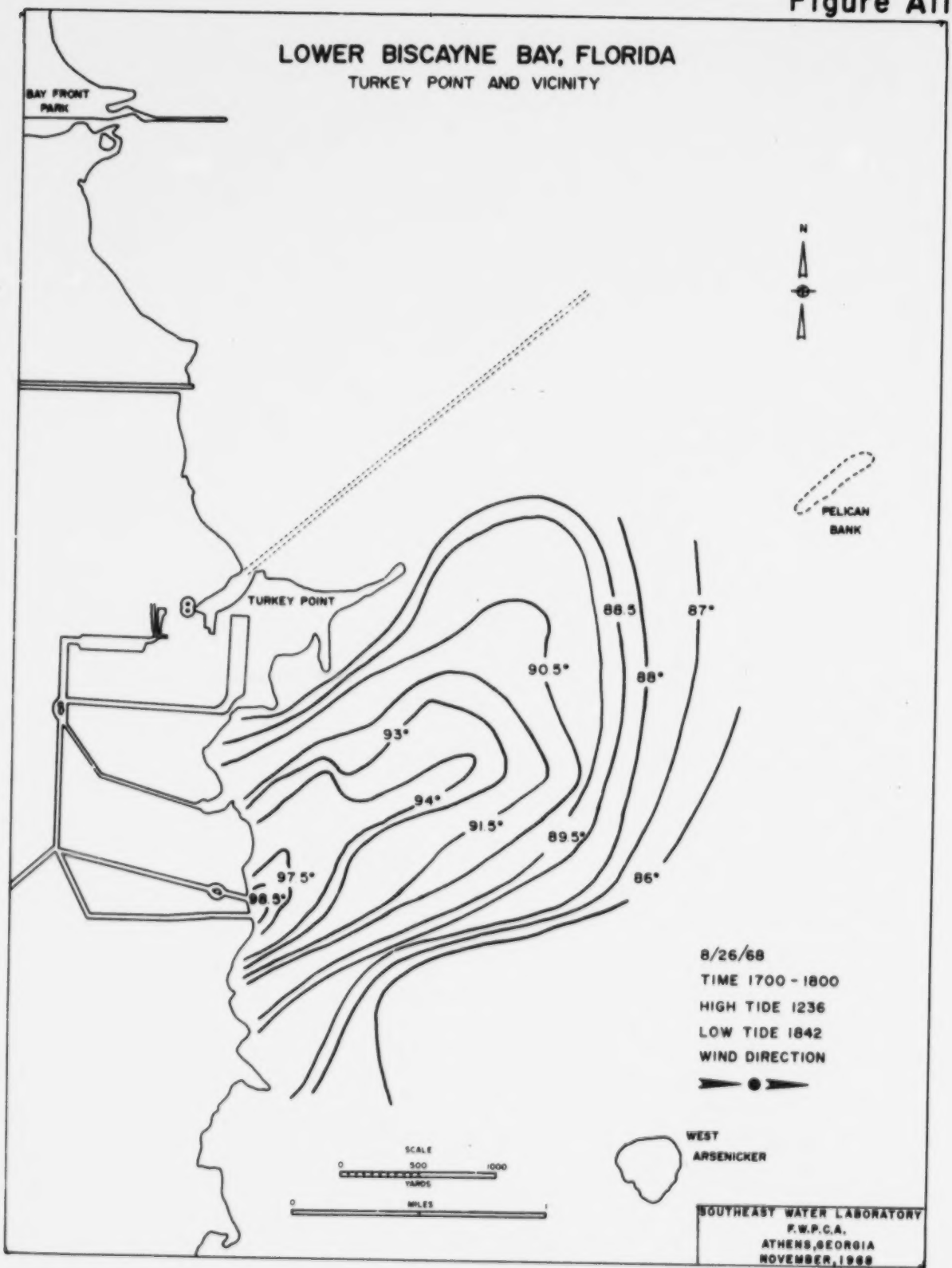

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
88.5
87°
90.5°
88°
93°
94°
91.5°
89.5°
97.5°
98.5°
86°
8/26/68
TIME 1700 - 1800
HIGH TIDE 1236
LOW TIDE 1842
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A12

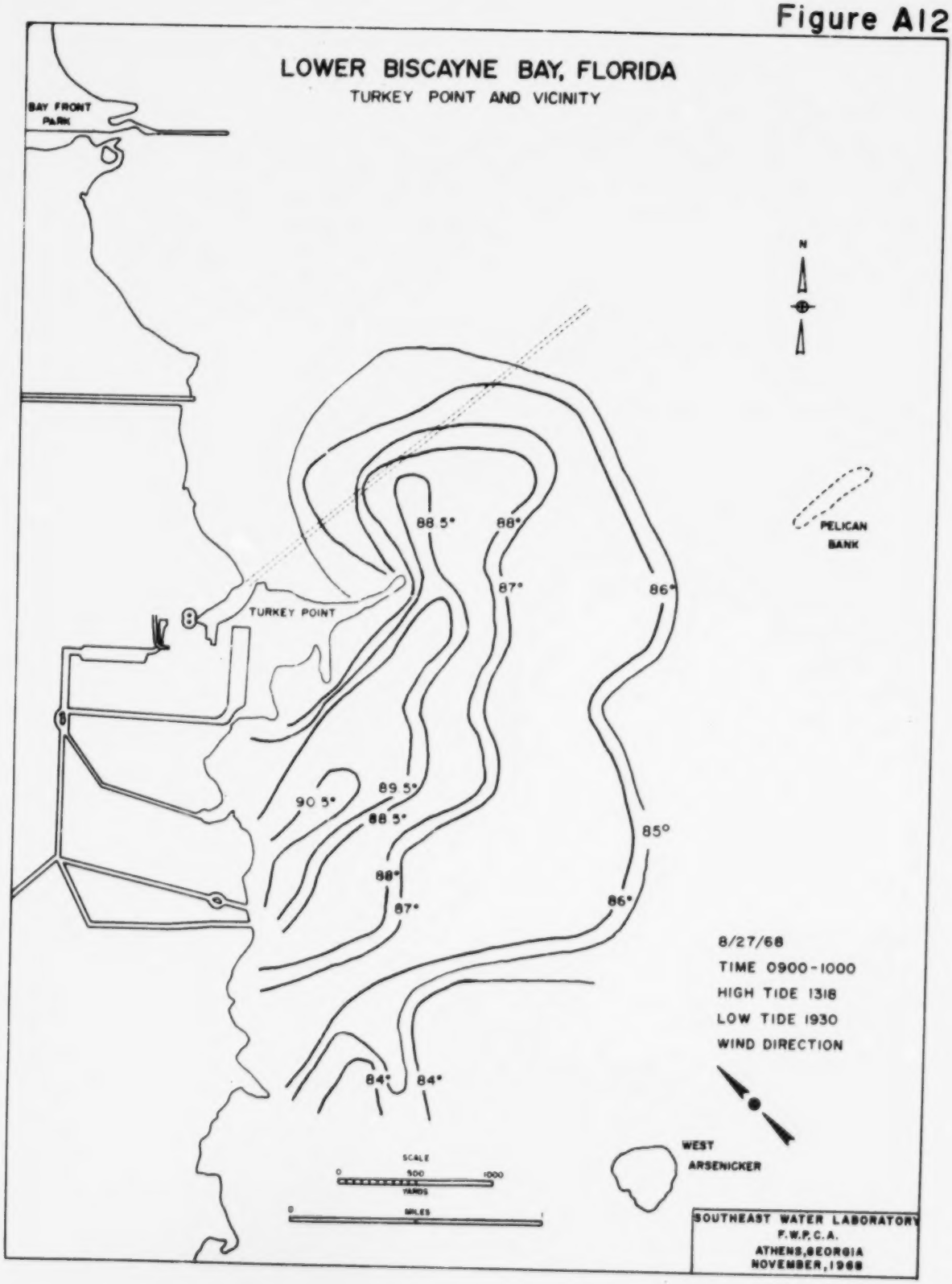

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
88 5°
88°
87°
86°
90 5°
89 5°
88 5°
85°
88°
87°
86°
84°
84°
8/27/68
TIME 0900-1000
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A13

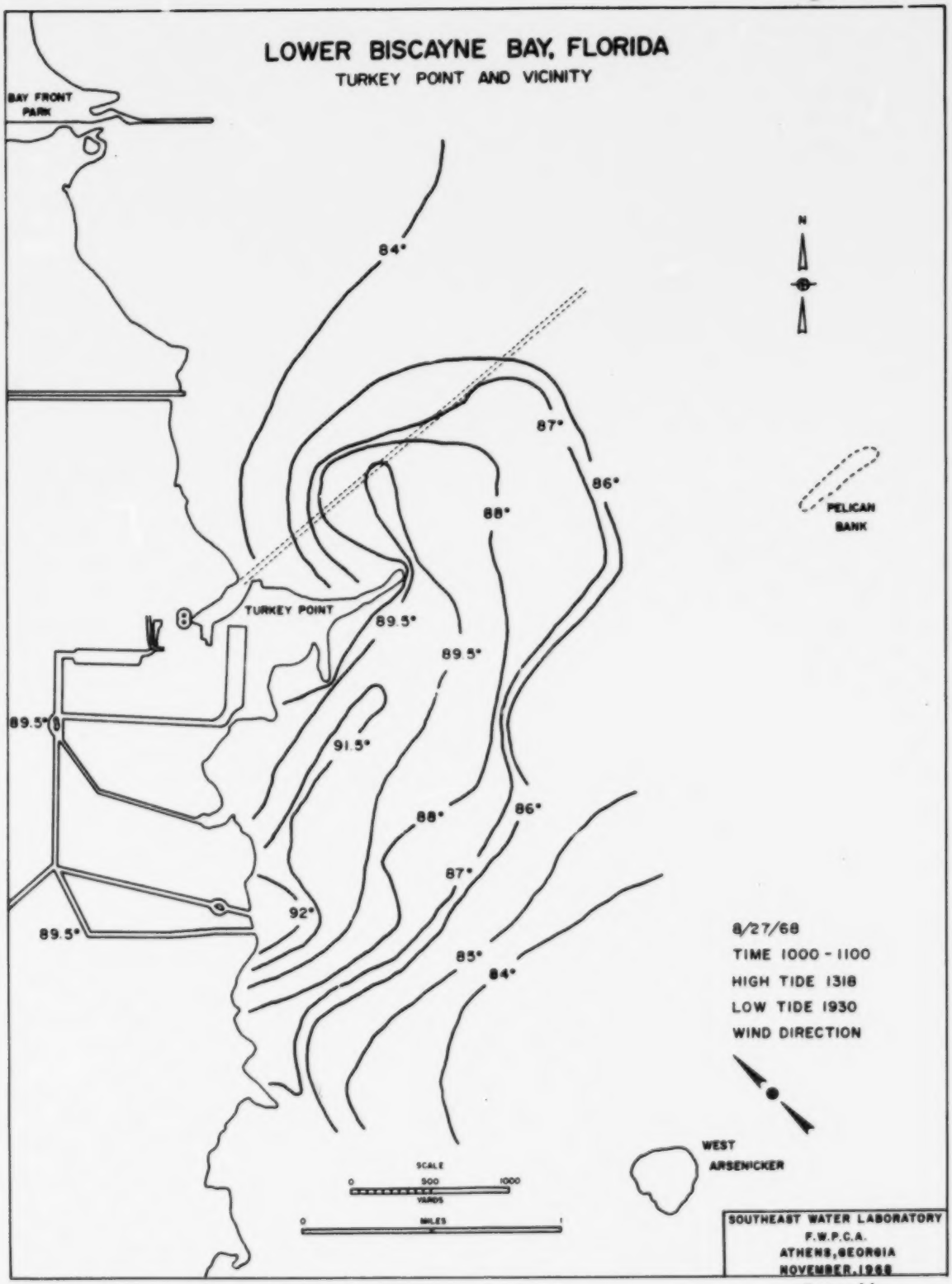

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
84°
87°
86°
88°
PELICAN BANK
TURKEY POINT
89.5°
89.5°
89.5°
91.5°
88°
86°
87°
92°
89.5°
85°
84°
N
8/27/68
TIME 1000 - 1100
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A14

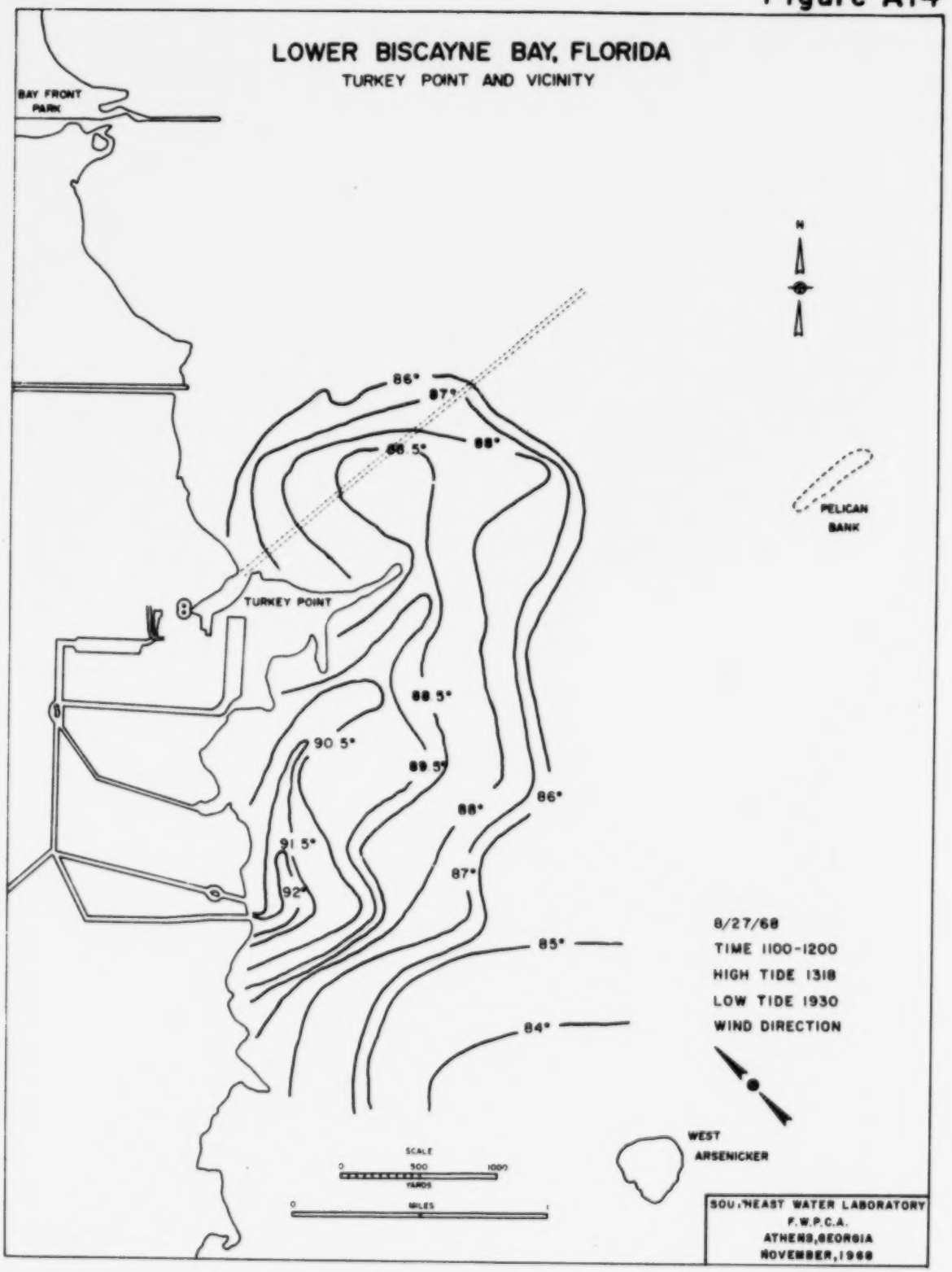

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
86°
87°
88°
88 5°
PELICAN BANK
TURKEY POINT
88 5°
90 5°
89 5°
88°
86°
91 5°
92°
87°
85°
84°
8/27/68
TIME 1100-1200
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A15

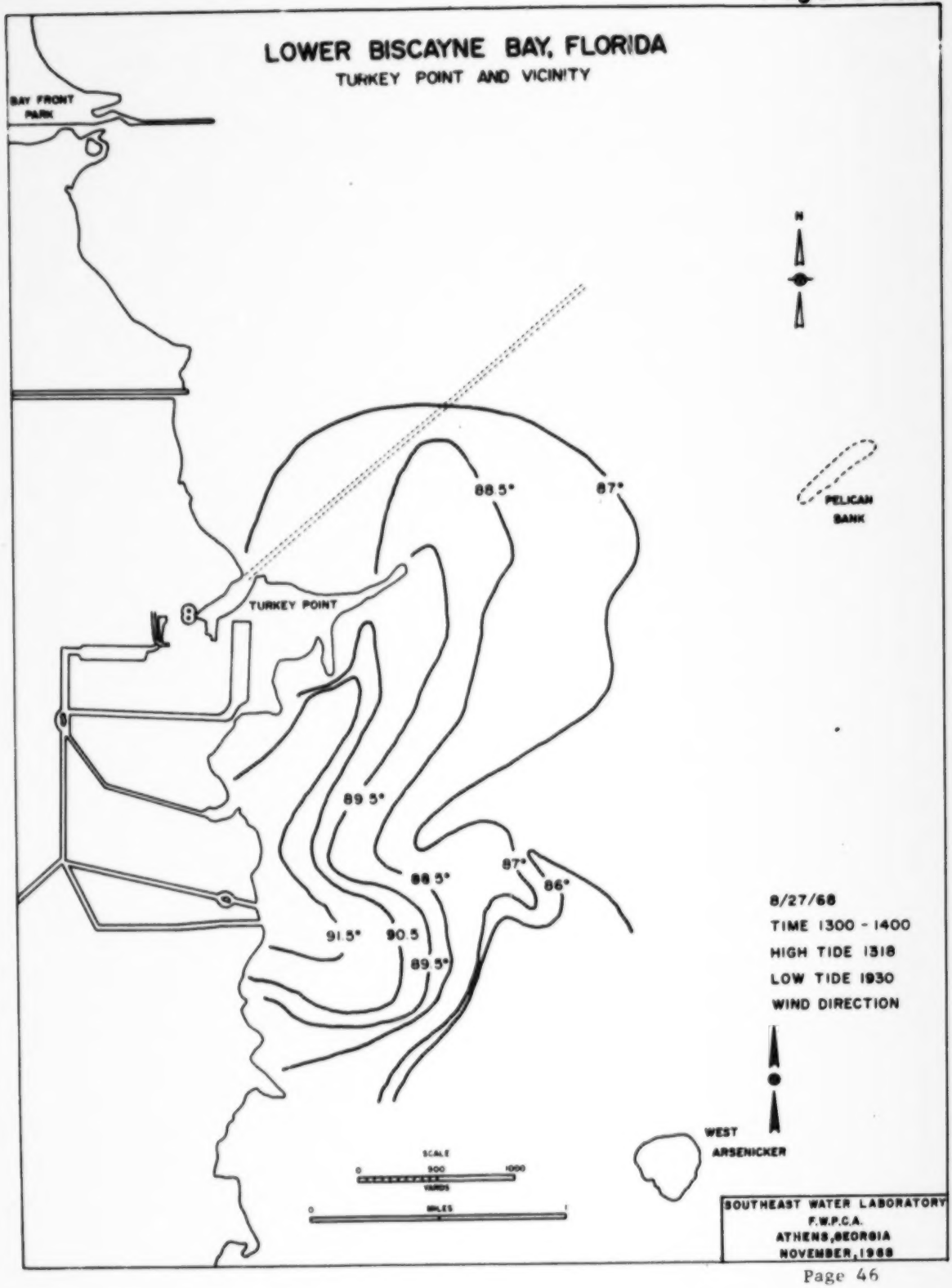

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
88.5°
87°
89.5°
88.5°
87°
86°
91.5°
90.5
89.5°
8/27/68
TIME 1300 - 1400
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0
500
1000
YARDS
0
MILES
1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A16

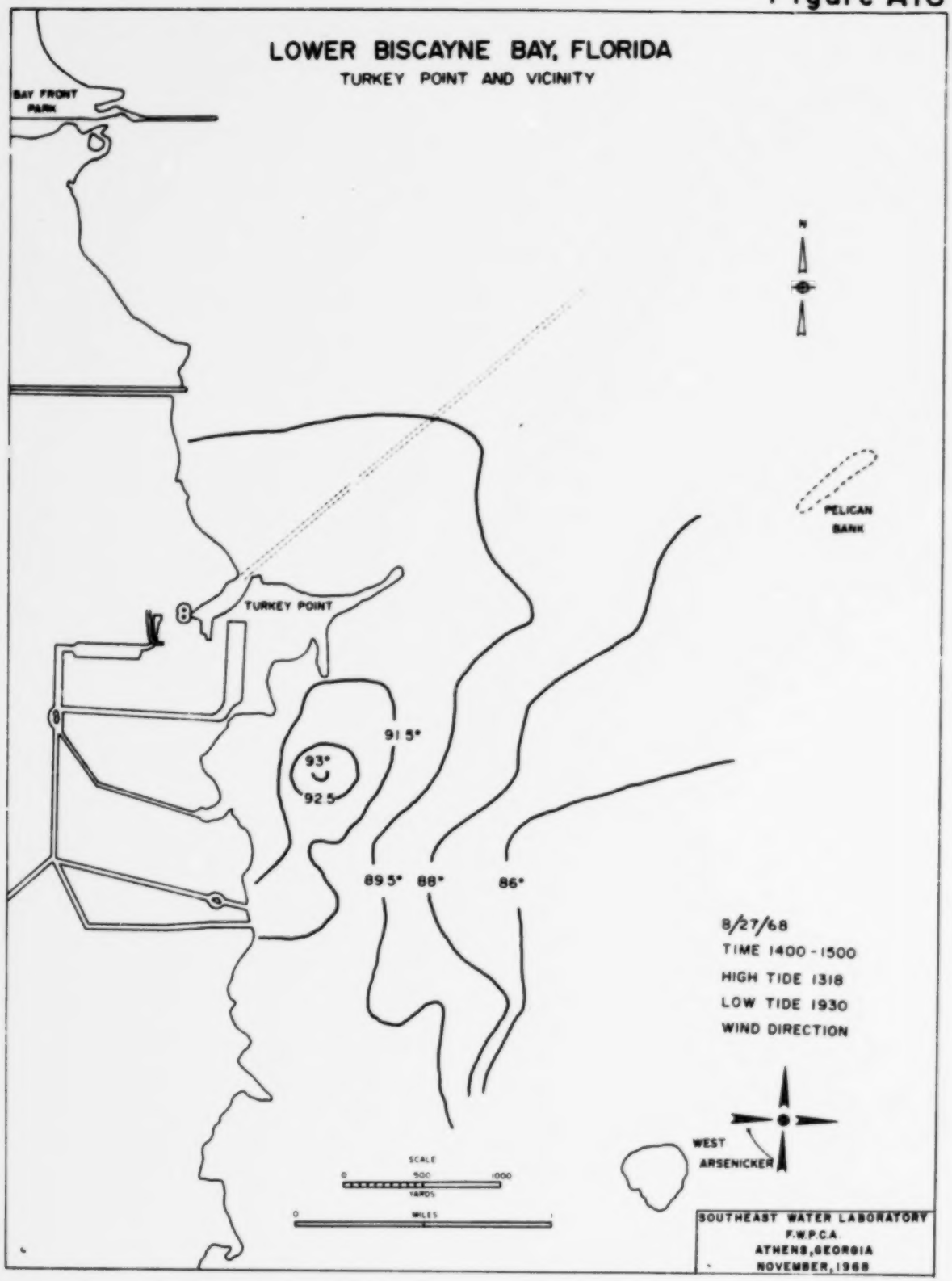

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
91.5°
93°
92.5
89.5°
88°
86°
8/27/68
TIME 1400 - 1500
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A 17

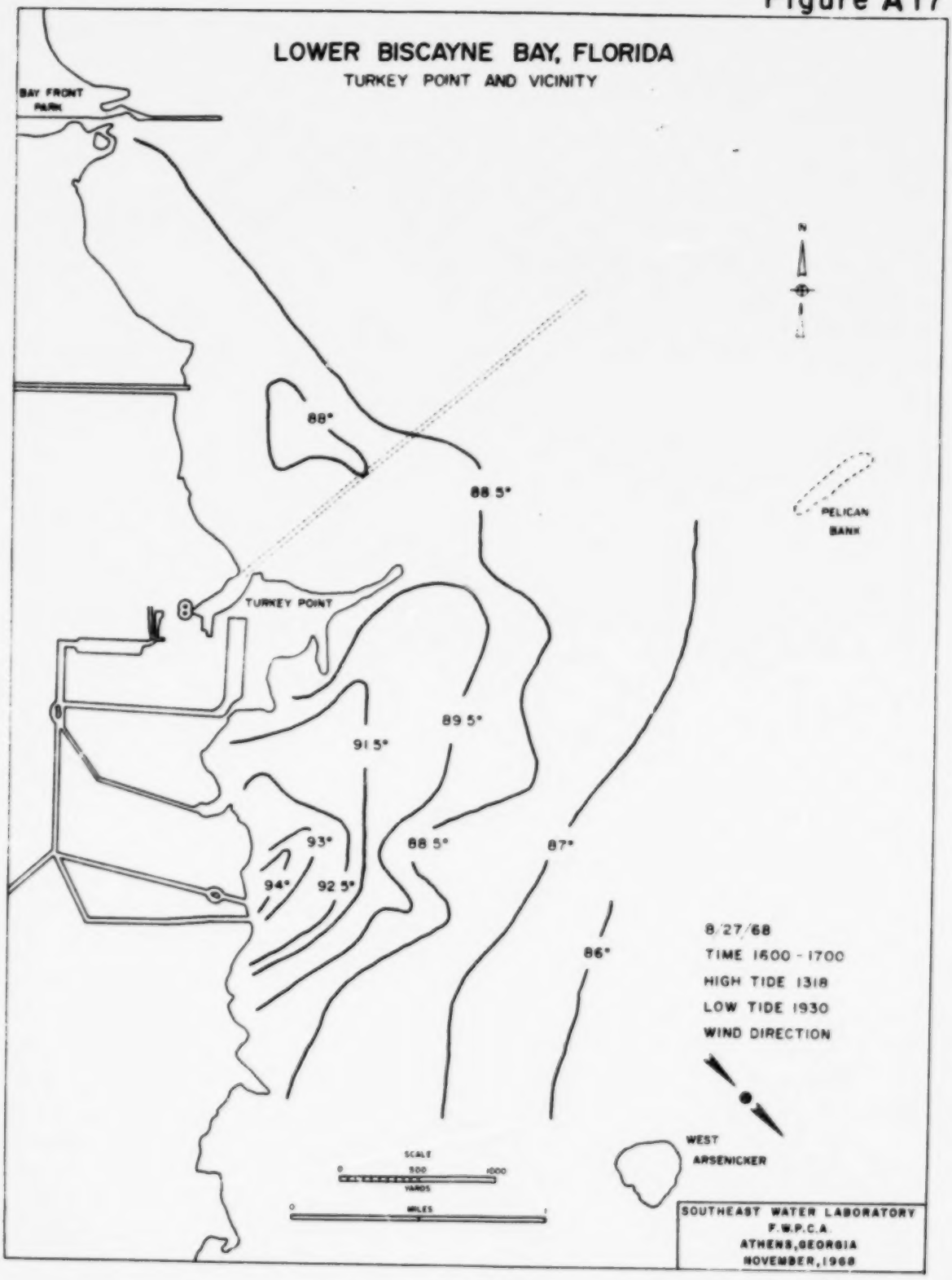

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
88 5°
PELICAN BANK
TURKEY POINT
89 5°
91 5°
93°
88 5°
87°
94°
92 5°
86°
8/27/68
TIME 1600 - 1700
HIGH TIDE 1318
LOW TIDE 1930
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A18

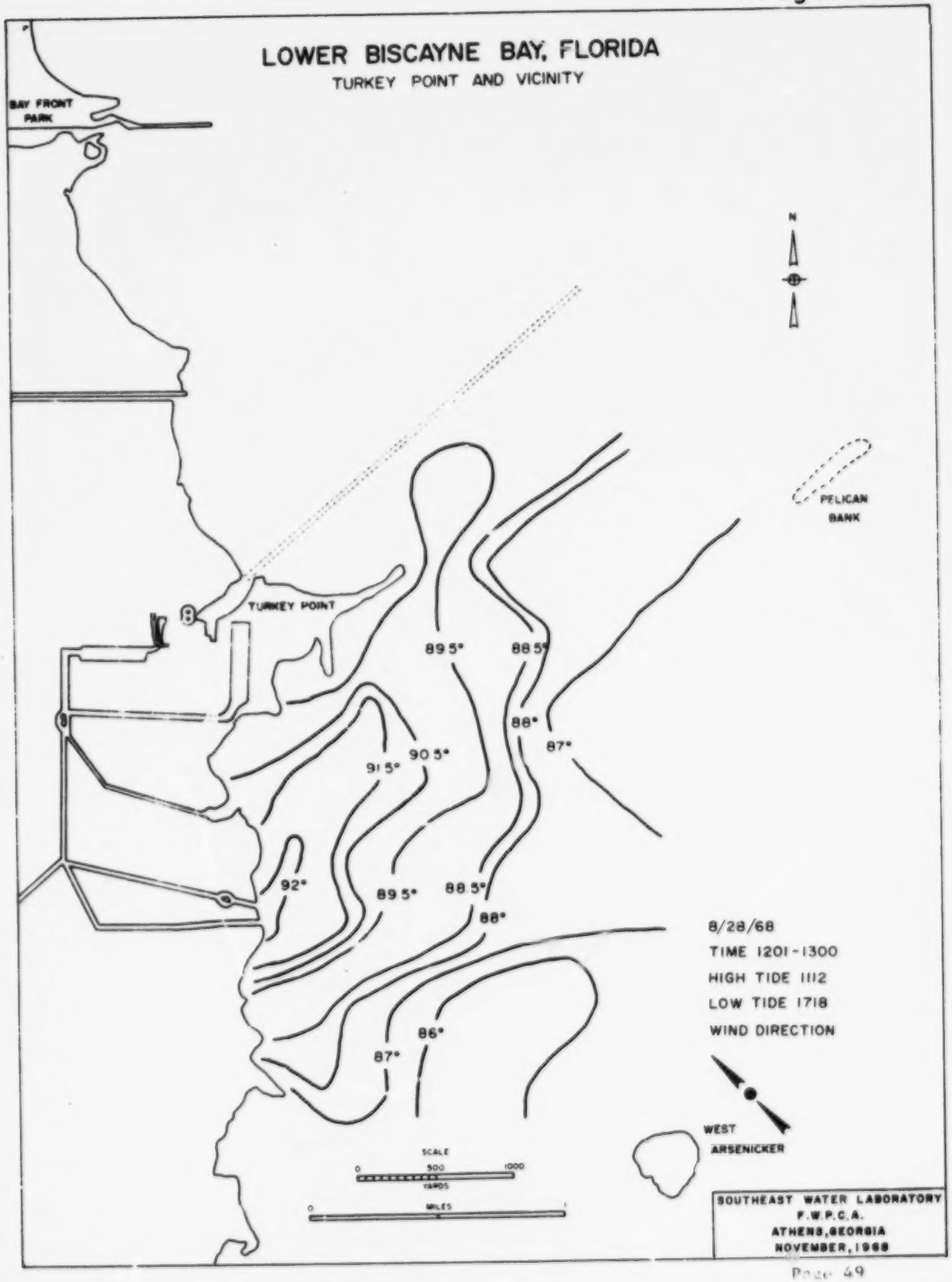

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
TURKEY POINT
89.5°
88.5°
88°
87°
91.5°
90.5°
92°
89.5°
88.5°
88°
86°
87°
8/28/68
TIME 1201-1300
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A19

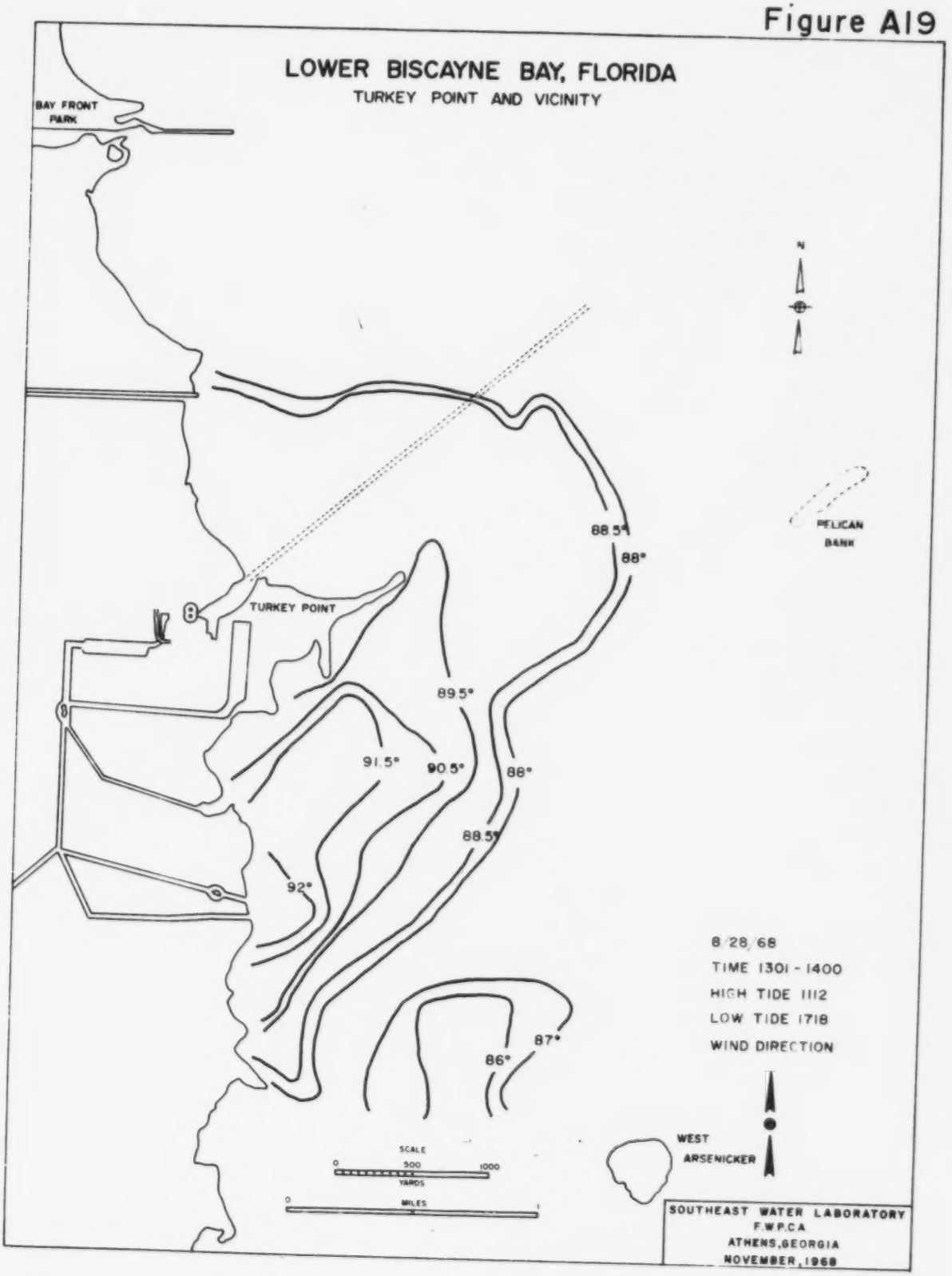

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
TURKEY POINT
PELICAN BANK
88.5°
88°
89.5°
91.5°
90.5°
88°
88.5°
92°
87°
86°
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
8/28/68
TIME 1301 - 1400
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
SOUTHEAST WATER LABORATORY
F.W.P.C.A
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A 20

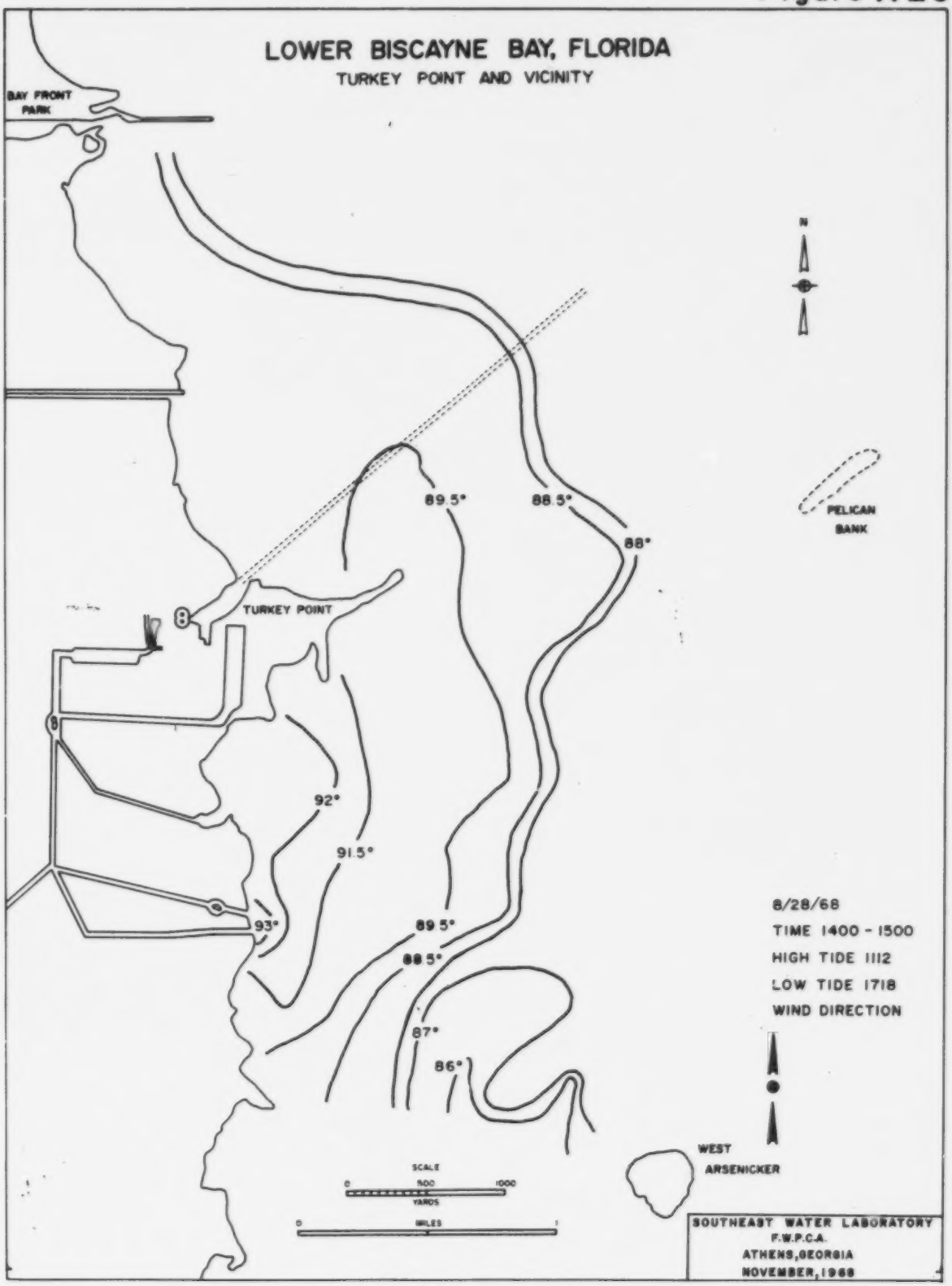

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
PELICAN BANK
89.5°
88.5°
88°
TURKEY POINT
92°
91.5°
93°
89.5°
88.5°
87°
86°
8/28/68
TIME 1400 - 1500
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A21

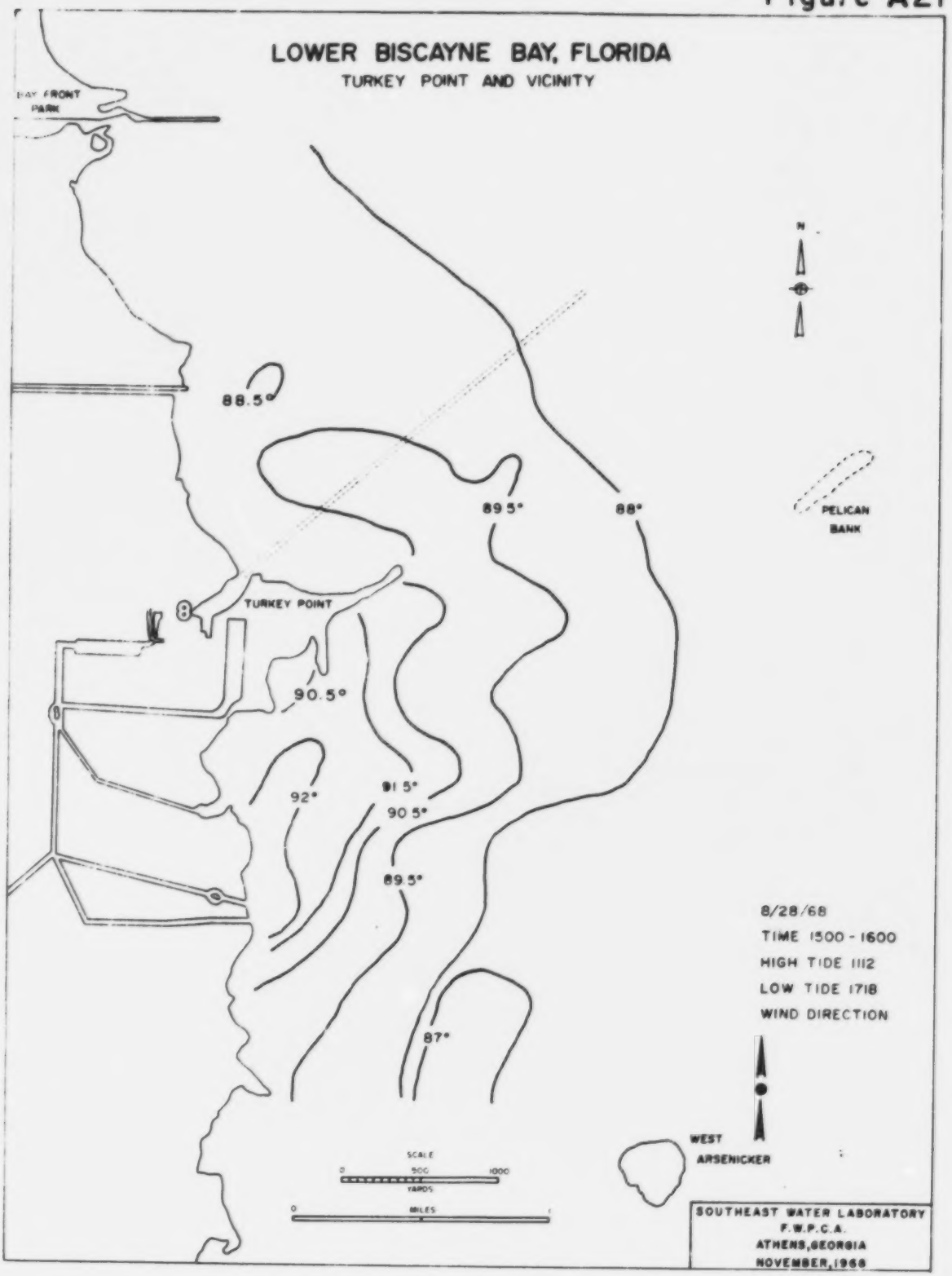

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
88.5°
89.5°
88°
PELICAN BANK
TURKEY POINT
90.5°
92°
91.5°
90.5°
89.5°
87°
N
8/28/68
TIME 1500 - 1600
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A22

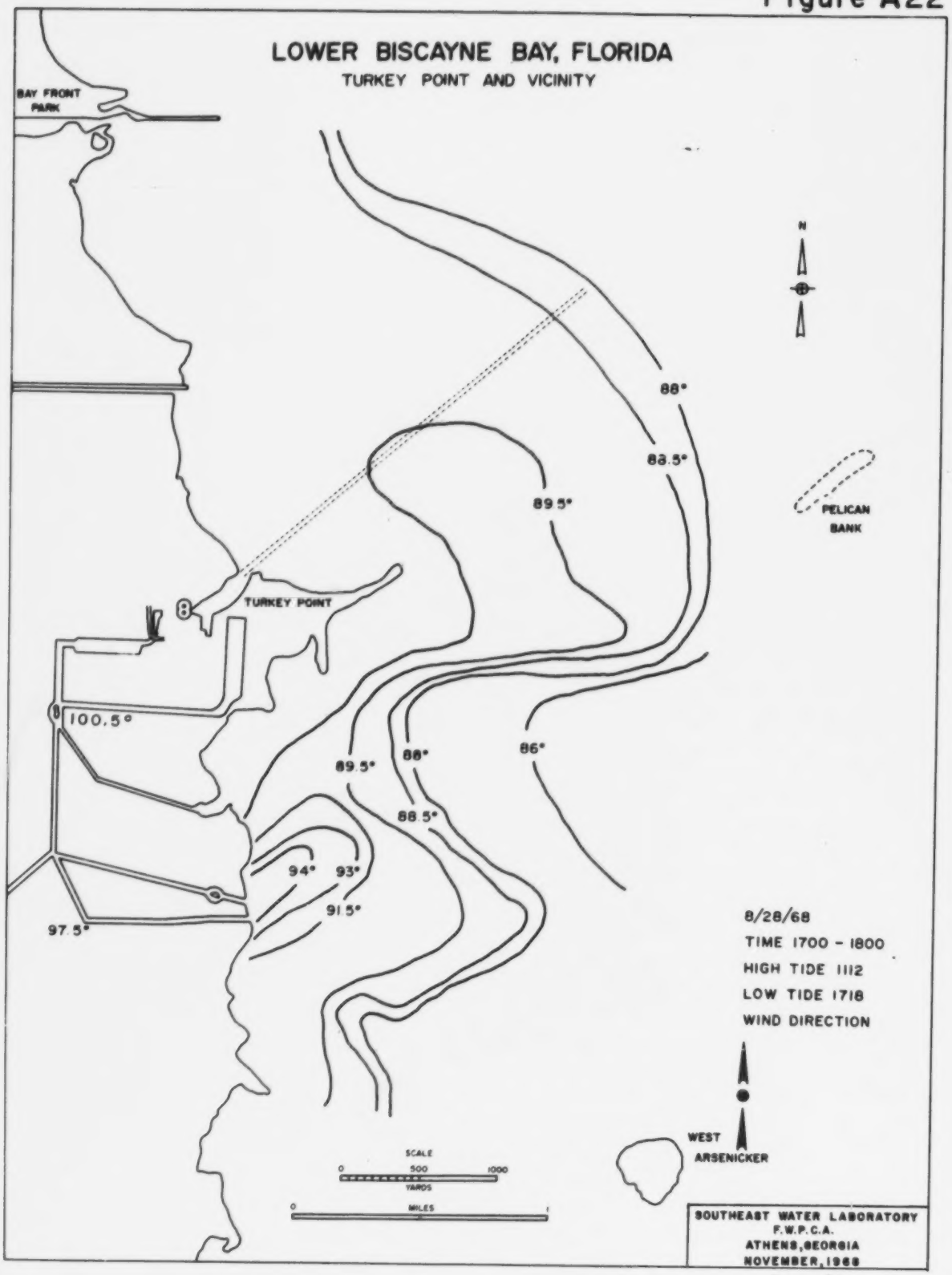
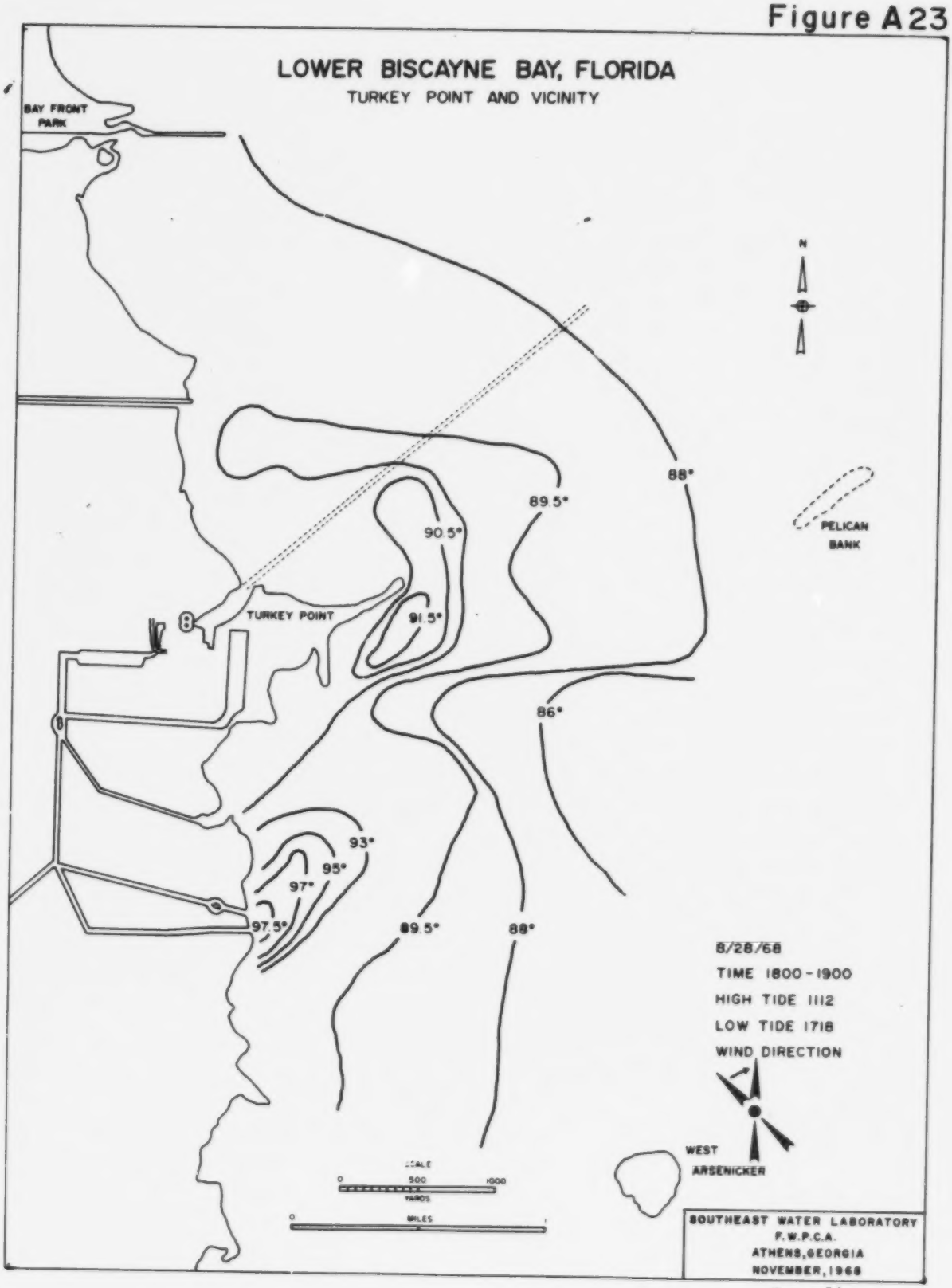

LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
88.5°
89.5°
PELICAN BANK
TURKEY POINT
100.5°
89.5°
88°
86°
88.5°
94°
93°
91.5°
97.5°
8/28/68
TIME 1700 - 1800
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 1
MILES
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

Figure A23


LOWER BISCAYNE BAY, FLORIDA
TURKEY POINT AND VICINITY
BAY FRONT PARK
N
88°
89.5°
90.5°
91.5°
TURKEY POINT
PELICAN BANK
86°
93°
95°
97°
97.5°
89.5°
88°
8/28/68
TIME 1800-1900
HIGH TIDE 1112
LOW TIDE 1718
WIND DIRECTION
WEST ARSENICKER
SCALE
0 500 1000
YARDS
0 MILES 1
SOUTHEAST WATER LABORATORY
F.W.P.C.A.
ATHENS, GEORGIA
NOVEMBER, 1968

APPENDIX B

SUMMARY OF MONITORING DATA

TABLE B-1

MAXIMUM WATER TEMPERATURE, BY TWO WEEK PERIODS,
LOWER BISCAYNE BAY FROM APRIL THROUGH AUGUST, 1968

	PERIOD						
STATION	APR 9 - APR 23	MAY 4 - MAY 17	MAY 18 - JUN 1	JUN 2 - JUN 14	JUN 15 - JUN 28	JUL 29 - AUG 12	AUG 13 - AUG 27
A1	82	87				90	91
B4	82	85	86	87	89	90	90
C6		82	85		86	87	88
D8	80	84	87		84	87	
E9	82	82			87	87	87
G12		84	86			90	91
G15		84				90	90
H13	83	88	88		92	92	93
H13A						94	96
H14	81	86	87				93

TABLE B-2

RANGE OF DIFFERENCE BETWEEN MAXIMUM AND MINIMUM DAILY TEMPERATURE AND THE AVERAGE DAILY DIFFERENCE IN LATE JULY AND AUGUST AT ALL MONITOR STATIONS

	PERIOD			
	Jul 29 - AUG 12		AUG 13 - AUG 26	
STATION	RANGE (°F)	AVERAGE DAILY DIFFERENCE (°F)	RANGE (°F)	AVERAGE DAILY DIFFERENCE (°F)
B4	2-6°	3.7°	2-5°	3.4°
C6	2-4°	2.5°	2-4°	2.7°
E9	2-4°	2.2°	1-3°	1.9°
H13	2-8°	4.2°	2-4°	2.6°
H13A	No Data	No Data	2-9°	4.0°
H14	No Data	No Data	3-7°	4.5°
G12	2-5°	3.3°	2-5°	3.5°
A1	2-7°	4.3°	2-6°	3.6°
G15	2-4°	2.8°	1-3°	2.5°

TABLE B-3

HOURLY RATE OF CHANGE (°F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 12, 1968

	STATION					
TIME	H13	H13A	H14	E9	C6	B4
400-0100						
100-0200						
200-0300						
300-0400						
400-0500						
500-0600						
600-0700						
700-0800						
800-0900						
900-1000						
000-1100						
100-1200					1.00	0.00
200-1300					0.00	0.00
300-1400				0.00	0.00	0.00
400-1500	0.00	0.00		0.00	1.00	0.00
500-1600	0.00	1.00	0.00	1.00	0.00	0.00
600-1700	0 00	0.00	0.00	0.00	1.00	0.00
700-1800	0.00	1 00	0 00	0.00	0.00	0.00
800-1900	1.00	1.00	1 00	0.00	1.00	0.00
900-2000	0 00	0.00	0.00	0.00	0.00	1.00
000-2100	0.00	0.00	0.00	1.00	0.00	0.00
100-2200	0.00	1.00	1.00	0.00	0.00	1.00
200-2300	0.00	0.00	1.00	0.00	1.00	0.00
2400	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-4

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 13, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	0.00	0.00	0.00	0.00
0100-0200	0.00	1.00	1.00	0.00	0.00	0.00
0200-0300	0.00	0.00	0.00	0.00	0.00	1.00
0300-0400	0.00	1.00	0.00	0.00	0.00	0.00
0400-0500	1.00	0.00	0.00	0.00	0.00	1.00
0500-0600	0.00	0.00	0.00	1.00	0.00	0.00
0600-0700	0.00	0.00	0.00	0.00	1.00	0.00
0700-0800	0.00	0.00	0.00	0.00	1.00	2.00
0800-0900	0.00	1.00	0.00	0.00	1.00	0.00
0900-1000	0.00	2.00	0.00	1.00	0.00	0.00
1000-1100	0.00	0.00	0.00	1.00	0.00	1.00
1100-1200	0.00	0.00	0.00	0.00	0.00	0.00
1200-1300	1.00	0.00	1.00	0.00	1.00	1.00
1300-1400	1.00	1.00	0.00	0.00	0.00	0.00
1400-1500	0.00	0.00	1.00	0.00	0.00	0.00
1500-1600	0.00	0.00	1.00	0.00	1.00	1.00
1600-1700	0.00	0.00	1.00	0.00	0.00	0.00
1700-1800	0.00	0.00	0.00	0.00	0.00	0.00
1800-1900	0.00	0.00	0.00	0.00	0.00	0.00
1900-2000	0.00	0.00	1.00	0.00	1.00	1.00
2000-2100	0.00	0.00	0.00	1.00	0.00	0.00
2100-2200	0.00	1.00	1.00	0.00	0.00	0.00
2200-2300	0.00	0.00	1.00	0.00	0.00	1.00
2300-2400	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-5

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 14, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	1.00	1.00	0.00	0.00	0.00	1.00
0100-0200	0.00	0.00	1.00	1.00	0.00	0.00
0200-0300	0.00	1.00	0.00	0.00	0.00	0.00
0300-0400	0.00	0.00	0.00	0.00	0.00	0.00
0400-0500	0.00	0.00	0.00	0.00	0.00	1.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	1.00	1.00	0.00	0.00	0.00	0.00
0800-0900	0.00	1.00	0.00	0.00	0.00	1.00
0900-1000	0.00	0.00	0.00	1.00	0.00	0.00
1000-1100	0.00	1.00	0.00	0.00	0.00	0.00
1100-1200	0.00	1.00	1.00	0.00	1.00	1.00
1200-1300	1.00	2.00	0.00	0.00	0.00	1.00
1300-1400	0.00	1.00	1.00	1.00	0.00	0.00
1400-1500	0.00	0.00	0.00	0.00	1.00	0.00
1500-1600	0.00	0.00	0.00	0.00	0.00	1.00
1600-1700	0.00	0.00	0.00	0.00	1.00	0.00
1700-1800	0.00	1.00	0.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00	1.00	1.00
1900-2000	0.00	0.00	0.00	0.00	0.00	0.00
2000-2100	0.00	0.00	0.00	0.00	0.00	0.00
2100-2200	0.00	0.00	1.00	0.00	0.00	0.00
2200-2300	0.00	0.00	0.00	1.00	0.00	1.00
2300-2400	0.00	0.00	1.00	0.00	0.00	0.00

TABLE B-6

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 15, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	1.00	0.00	0.00	1.00	0.00
0100-0200	0.00	0.00	0.00	0.00	0.00	1.00
0200-0300	0.00	1.00	0.00	1.00	0.00	0.00
0300-0400	0.00	0.00	0.00	0.00	1.00	0.00
0400-0500	0.00	1.00	0.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	1.00
0600-0700	0.00	1.00	1.00	0.00	1.00	0.00
0700-0800	0.00	0.00	0.00	0.00	0.00	0.00
0800-0900	0.00	0.00	1.00	0.00	0.00	0.00
0900-1000	1.00	0.00	1.00	0.00	0.00	1.00
1000-1100	0.00	2.00	1.00	1.00	0.00	0.00
1100-1200	0.00	1.00	1.00	0.00	0.00	1.00
1200-1300	0.00	1.00	0.00	1.00	0.00	1.00
1300-1400	0.00	1.00	1.00	0.00	0.00	0.00
1400-1500	0.00	0.00	0.00	0.00	1.00	1.00
1500-1600	0.00	0.00	0.00	0.00	0.00	0.00
1600-1700	0.00	0.00	1.00	0.00	0.00	0.00
1700-1800	1.00	0.00	0.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00	1.00	0.00
1900-2000	0.00	0.00	0.00	0.00	0.00	1.00
2000-2100	0.00	0.00	0.00	0.00	0.00	1.00
2100-2200	0.00	1.00	0.00	0.00	0.00	0.00
2200-2300	0.00	0.00	1.00	0.00	0.00	0.00
2300-2400	0.00	0.00	0.00	1.00	0.00	0.00

TABLE B-7

HOURLY RATE OF CHANGE (°F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 16, 1968

	STATION					
TIME	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	0.00	0.00	0.00	0.00
0100-0200	0.00	1.00	0.00	0.00	1.00	0.00
0200-0300	0.00	0.00	0.00	0.00	0.00	0.00
0300-0400	0.00	1.00	0.00	0.00	0.00	1.00
0400-0500	0.00	0.00	1.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	1.00	0.00	0.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	0.00	0.00	1.00	0.00	0.00	1.00
0800-0900	0.00	1.00	0.00	0.00	0.00	0.00
0900-1000	0.00	1.00	0.00	1.00	0.00	0.00
1000-1100	0.00	0.00	1.00	0.00	0.00	2.00
1100-1200	0.00	1.00	0.00	0.00	0.00	0.00
1200-1300	0.00	0.00	0.00	1.00	1.00	1.00
1300-1400	0.00	1.00	1.00	0.00	0.00	1.00
1400-1500	0.00	0.00	0.00	0.00	0.00	0.00
1500-1600	0.00	0.00	0.00	0.00	0.00	1.00
1600-1700	0.00	0.00	0.00	0.00	0.00	0.00
1700-1800	0.00	0.00	0.00	0.00	0.00	0.00
1800-1900	0.00	0.00	0.00	0.00	2.00	1.00
1900-2000	0.00	0.00	0.00	0.00	1.00	0.00
2000-2100	0.00	0.00	1.00	0.00	0.00	0.00
2100-2200	3.00	1.00	0.00	0.00	0.00	1.00
2200-2300	1.00	0.00	0.00	0.00	0.00	0.00
2300-2400	0.00	1.00	1.00	0.00	0.00	0.00

TABLE B-8

HOURLY RATE OF CHANGE (°F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 17, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	0.00	1.00	0.00	1.00
0100-0200	1.00	1.00	0.00	0.00	1.00	0.00
0200-0300	0.00	0.00	0.00	0.00	0.00	0.00
0300-0400	1.00	1.00	0.00	0.00	0.00	0.00
0400-0500	0.00	0.00	1.00	0.00	1.00	1.00
0500-0600	0.00	0.00	1.00	0.00	0.00	0.00
0600-0700	0.00	0.00	0.00	0.00	0.00	0.00
0700-0800	0.00	0.00	1.00	1.00	1.00	1.00
0800-0900	0.00	3.00	1.00	0.00	0.00	0.00
0900-1000	0.00	1.00	2.00	0.00	0.00	0.00
1000-1100	0.00	1.00	0.00	1.00	1.00	0.00
1100-1200	0.00	0.00	0.00	0.00	0.00	1.00
1200-1300	0.00	1.00	1.00	1.00	0.00	1.00
1300-1400	0.00	1.00	0.00	0.00	0.00	0.00
1400-1500	0.00	1.00	0.00	1.00	0.00	1.00
1500-1600	0.00	1.00	0.00	0.00	1.00	1.00
1600-1700	0.00	0.00	0.00	0.00	0.00	0.00
1700-1800	0.00	0.00	0.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00	1.00	0.00
1900-2000	0.00	0.00	0.00	0.00	0.00	0.00
2000-2100	0.00	1.00	1.00	1.00	0.00	0.00
2100-2200	2.00	1.00	0.00	0.00	0.00	0.00
2200-2300	0.00	0.00	0.00	0.00	0.00	0.00
2300-2400	0.00	1.00	0.00	0.00	0.00	1.00

TABLE B-9

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 18, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	1.00	1.00	0.00	0.00	0.00
0100-0200	0.00	0.00	1.00	0.00	0.00	1.00
0200-0300	0.00	0.00	0.00	0.00	0.00	0.00
0300-0400	1.00	0.00	0.00	0.00	0.00	1.00
0400-0500	0.00	1.00	0.00	1.00	0.00	0.00
0500-0600	1.00	0.00	0.00	0.00	0.00	0.00
0600-0700	1.00	0.00	0.00	0.00	0.00	0.00
0700-0800	1.00	0.00	1.00	0.00	0.00	0.00
0800-0900	0.00	2.00	0.00	0.00	0.00	1.00
0900-1000	0.00	0.00	0.00	0.00	1.00	0.00
1000-1100	1.00	1.00	1.00	0.00	0.00	1.00
1100-1200	1.00	1.00	0.00	1.00	0.00	0.00
1200-1300	0.00	0.00	0.00	0.00	0.00	2.00
1300-1400	1.00	0.00	0.00	0.00	0.00	0.00
1400-1500	0.00	0.00	1.00	0.00	0.00	1.00
1500-1600	0.00	1.00	0.00	0.00	1.00	1.00
1600-1700	0.00	0.00	0.00	1.00	0.00	0.00
1700-1800	0.00	0.00	0.00	0.00	1.00	0.00
1800-1900	0.00	0.00	0.00	0.00	0.00	0.00
1900-2000	0.00	0.00	1.00	0.00	0.00	0.00
2000-2100	1.00	0.00	0.00	1.00	0.00	1.00
2100-2200	0.00	1.00	0.00	0.00	0.00	0.00
2200-2300	0.00	0.00	0.00	0.00	0.00	1.00
2300-2400	0.00	1.00	0.00	0.00	1.00	0.00

TABLE B-10

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 19, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	1.00	0.00	0.00	0.00
0100-0200	0.00	0.00	1.00	0.00	0.00	0.00
0200-0300	0.00	0.00	1.00	1.00	0.00	1.00
0300-0400	0.00	0.00	1.00	0.00	0.00	0.00
0400-0500	0.00	0.00	0.00	0.00	0.00	0.00
0500-0600	1.00	0.00	0.00	0.00	0.00	0.00
0600-0700	1.00	0.00	0.00	0.00	0.00	1.00
0700-0800	0.00	0.00	0.00	0.00	0.00	0.00
0800-0900	0.00	1.00	0.00	0.00	0.00	0.00
0900-1000	0.00	0.00	0.00	0.00	0.00	0.00
1000-1100	0.00	1.00	0.00	0.00	1.00	0.00
1100-1200	0.00	0.00	0.00	1.00	0.00	1.00
1200-1300	0.00	1.00	1.00	0.00	1.00	0.00
1300-1400	0.00	1.00	1.00	0.00	0.00	0.00
1400-1500	0.00	2.00	0.00	1.00	0.00	0.00
1500-1600	0.00	2.00	0.00	0.00	0.00	1.00
1600-1700	0.00	0.00	1.00	0.00	0.00	2.00
1700-1800	0.00	1.00	0.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00	0.00	0.00
1900-2000	2.00	2.00	1.00	0.00	0.00	0.00
2000-2100	0.00	0.00	0.00	1.00	1.00	0.00
2100-2200	0.00	2.00	0.00	0.00	0.00	1.00
2200-2300	0.00	0.00	0.00	0.00	1.00	0.00
2300-2400	0.00	0.00	0.00	0.00	0.00	1.00

TABLE B-11

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 20, 1968

	STATION					
TIME	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	1.00	0.00	0.00	0.00	0.00
0100-0200	0.00	0.00	0.00	0.00	0.00	0.00
0200-0300	0.00	1.00	0.00	0.00	0.00	0.00
0300-0400	0.00	0.00	1.00	0.00	0.00	0.00
0400-0500	0.00	0.00	1.00	1.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	0.00	0.00	0.00	0.00	1.00
0700-0800	1.00	1.00	.00	0.00	1.00	1.00
0800-0900	1.00	0.00	1.00	0.00	0.00	0.00
0900-1000	0.00	1.00	0.00	0.00	0.00	0.00
1000-1100	0.00	0.00	1.00	0.00	0.00	0.00
1100-1200	0.00	0.00	0.00	1.00	0.00	0.00
1200-1300	0.00	0.00	0.00	0.00	0.00	1.00
1300-1400	0.00	1.00	2.00	1.00	1.00	1.00
1400-1500	0.00	1.00	0.00	0.00	0.00	1.00
1500-1600	0.00	1.00	1.00	0.00	0.00	0.00
1600-1700	0.00	1.00	1.00	0.00	0.00	0.00
1700-1800	0.00	2.00	0.00	0.00	0.00	1.00
1800-1900	0.00	1.00	1.00	0.00	1.00	0.00
1900-2000	0.00	0.00	1.00	0.00	0.00	0.00
2000-2100	1.00	0.00	0.00	0.00	0.00	0.00
2100-2200	0.00	1.00	0.00	1.00	0.00	1.00
2200-2300	0.00	0.00	1.00	0.00	0.00	0.00
2300-2400	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-12

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 21, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	1.00	0.00	0.00	1.00	0.00
0100-0200	0.00	1.00	0.00	0.00	0.00	1.00
0200-0300	1.00	0.00	1.00	0.00	0.00	0.00
0300-0400	0.00	0.00	0.00	0.00	0.00	0.00
0400-0500	0.00	1.00	0.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	0.00	1.00	0.00	0.00	1.00
0700-0800	0.00	0.00	0.00	0.00	0.00	1.00
0800-0900	0.00	0.00	0.00	0.00	0.00	0.00
0900-1000	0.00	1.00	1.00	1.00	0.00	0.00
1000-1100	0.00	0.00	0.00	1.00	0.00	0.00
1100-1200	0.00	0.00	1.00	0.00	1.00	0.00
1200-1300	0.00	0.00	0.00	0.00	0.00	0.00
1300-1400	0.00	0.00	1.00	0.00	1.00	0.00
1400-1500	1.00	1.00	0.00	0.00	0.00	2.00
1500-1600	1.00	2.00	2.00	0.00	0.00	0.00
1600-1700	0.00	1.00	2.00	1.00	1.00	1.00
1700-1800	0.00	0.00	1.00	0.00	0.00	0.00
1800-1900	0.00	1.00	1.00	0.00	0.00	0.00
1900-2000	0.00	1.00	1.00	0.00	1.00	0.00
2000-2100	1.00	0.00	1.00	0.00	0.00	1.00
2100-2200	0.00	0.00	1.00	0.00	0.00	0.00
2200-2300	0.00	0.00	1.00	0.00	1.00	0.00
2300-2400	0.00	1.00	0.00	0.00	0.00	1.00

TABLE B-13

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 22, 1968

	STATION					
TIME	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	1.00	0.00	1.00	0.00	0.00
0100-0200	1.00	0.00	0.00	0.00	0.00	1.00
0200-0300	0.00	0.00	0.00	0.00	0.00	0.00
0300-0400	0.00	1.00	0.00	0.00	0.00	0.00
0400-0500	0.00	0.00	1.00	0.00	1.00	1.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	0.00	1.00	0.00	0.00	0.00
0700-0800	0.00	0.00	1.00	0.00	0.00	0.00
0800-0900	0.00	1.00	2.00	0.00	0.00	0.00
0900-1000	0.00	0.00	2.00	0.00	0.00	0.00
1000-1100	0.00	0.00	0.00	0.00	1.00	1.00
1100-1200	0.00	0.00	0.00	0.00	0.00	1.00
1200-1300	0.00	0.00	0.00	0.00	0.00	0.00
1300-1400	0.00	0.00	0.00	0.00	0.00	0.00
1400-1500	0.00	0.00	0.00	0.00	0.00	0.00
1500-1600	0.00	1.00	2.00	0.00	0.00	0.00
1600-1700	0.00	0.00	2.00	1.00	0.00	0.00
1700-1800	0.00	1.00	1.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00	1.00	0.00
1900-2000	0.00	0.00	0.00	0.00	1.00	0.00
2000-2100	0.00	0.00	0.00	0.00	1.00	0.00
2100-2200	0.00	1.00	1.00	0.00	0.00	1.00
2200-2300	0.00	1.00	1.00	0.00	0.00	0.00
-2400	0.00	0.00	0.00	0.00	0.00	0.00

TABLE B-14

HOURLY RATE OF CHANGE (°F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 23, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	2.00	0.00	0.00	1.00
0100-0200	0.00	1.00	1.00	1.00	0.00	0.00
0200-0300	0.00	0.00	0.00	0.00	2.00	0.00
0300-0400	0.00	0.00	0.00	0.00	0.00	0.00
0400-0500	0.00	1.00	1.00	0.00	0.00	0.00
0500-0600	0.00	1.00	0.00	0.00	0.00	1.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	0.00	1.00	1.00	0.00	0.00	0.00
0800-0900	1.00	0.00	0.00	0.00	0.00	0.00
0900-1000	0.00	1.00	0.00	0.00	0.00	0.00
1000-1100	0.00	2.00	1.00	0.00	0.00	1.00
1100-1200	0.00	0.00	0.00	0.00	0.00	0.00
1200-1300	0.00	0.00	1.00	1.00	0.00	1.00
1300-1400	1.00	0.00	1.00	0.00	0.00	0.00
1400-1500	0.00	0.00	0.00	1.00	0.00	0.00
1500-1600	0.00	0.00	1.00	0.00	1.00	0.00
1600-1700	0.00	0.00	1.00	0.00	0.00	1.00
1700-1800	0.00	0.00	1.00	0.00	1.00	0.00
1800-1900	0.00	1.00	1.00	0.00	0.00	0.00
1900-2000	0.00	0.00	1.00	0.00	0.00	1.00
2000-2100	0.00	1.00	0.00	0.00	1.00	0.00
2100-2200	0.00	0.00	0.00	0.00	0.00	0.00
2200-2300	0.00	0.00	1.00	0.00	0.00	0.00
-2400	0.00	0.00	1.00	0.00	0.00	1.00

TABLE B-15

HOURLY RATE OF CHANGE (°F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 24, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	1.00	0.00	0.00	0.00
0100-0200	0.00	1.00	1.00	0.00	0.00	0.00
0200-0300	0.00	1.00	0.00	0.00	1.00	0.00
0300-0400	0.00	0.00	0.00	0.00	0.00	0.00
0400-0500	0.00	1.00	0.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	1.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	0.00	0.00	0.00	1.00	0.00	0.00
0800-0900	0.00	0.00	0.00	0.00	0.00	0.00
0900-1000	0.00	1.00	0.00	0.00	0.00	1.00
1000-1100	0.00	0.00	0.00	0.00	0.00	0.00
1100-1200	0.00	1.00	1.00	0.00	1.00	0.00
1200-1300	0.00	0.00	0.00	0.00	0.00	0.00
1300-1400	1.00	1.00	0.00	0.00	0.00	1.00
1400-1500	1.00	0.00	0.00	1.00	0.00	0.00
1500-1600	1.00	0.00	0.00	0.00	0.00	0.00
1600-1700	0.00	0.00	1.00	0.00	0.00	0.00
1700-1800	0.00	1.00	0.00	0.00	0.00	0.00
1800-1900	1.00	0.00	1.00	0.00	0.00	0.00
1900-2000	0.00	0.00	1.00	0.00	0.00	0.00
2000-2100	0.00	0.00	0.00	0.00	1.00	0.00
2100-2200	0.00	0.00	0.00	0.00	0.00	0.00
2200-2300	0.00	1.00	1.00	0.00	0.00	0.00
-2400	0.00	0.00	0.00	0.00	1.00	0.00

TABLE B-16

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 25, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	1.00	0.00	0.00	1.00
0100-0200	0.00	0.00	0.00	0.00	0.00	0.00
0200-0300	0.00	0.00	1.00	1.00	1.00	0.00
0300-0400	0.00	0.00	0.00	0.00	0.00	0.00
0400-0500	0.00	1.00	0.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	0.00	1.00	0.00	0.00	0.00	1.00
0800-0900	0.00	0.00	0.00	0.00	0.00	0.00
0900-1000	0.00	0.00	0.00	0.00	1.00	0.00
1000-1100	0.00	0.00	0.00	0.00	0.00	1.00
1100-1200	0.00	0.00	1.00	0.00	0.00	0.00
1200-1300	0.00	0.00	0.00	0.00	0.00	0.00
1300-1400	0.00	0.00	0.00	0.00	0.00	0.00
1400-1500	1.00	0.00	0.00	1.00	1.00	0.00
1500-1600	0.00	0.00	0.00	0.00	0.00	0.00
1600-1700	0.00	0.00	1.00	0.00	0.00	0.00
1700-1800	0.00	1.00	0.00	1.00	0.00	0.00
1800-1900	0.00	0.00	1.00	0.00	0.00	0.00
1900-2000	1.00	0.00	1.00	0.00	0.00	0.00
2000-2100	0.00	0.00	1.00	0.00	0.00	0.00
2100-2200	1.00	0.00	0.00	0.00	0.00	0.00
2200-2300	0.00	0.00	1.00	0.00	0.00	0.00
2300-2400	0.00	0.00	0.00	0.00	1.00	0.00

TABLE B-17

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 26, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	1.00	0.00	0.00	0.00
0100-0200	0.00	0.00	1.00	0.00	0.00	0.00
0200-0300	1.00	0.00	0.00	0.00	1.00	0.00
0300-0400	0.00	0.00	0.00	1.00	0.00	0.00
0400-0500	0.00	0.00	1.00	0.00	0.00	0.00
0500-0600	0.00	0.00	0.00	0.00	0.00	0.00
0600-0700	0.00	1.00	0.00	0.00	0.00	0.00
0700-0800	0.00	0.00	0.00	0.00	0.00	1.00
0800-0900	0.00	1.00	0.00	0.00	0.00	0.00
0900-1000	1.00	0.00	1.00	0.00	0.00	0.00
1000-1100	0.00	0.00	1.00	0.00	0.00	1.00
1100-1200	1.00	0.00	0.00	0.00	0.00	0.00
1200-1300	0.00	0.00	0.00	1.00	0.00	0.00
1300-1400	0.00	1.00	0.00	0.00	1.00	0.00
1400-1500	0.00	0.00	0.00	0.00	0.00	0.00
1500-1600	0.00	1.00	0.00	0.00	0.00	0.00
1600-1700	0.00	1.00	1.00	0.00	1.00	0.00
1700-1800	0.00	0.00	0.00	0.00	0.00	0.00
1800-1900	0.00	1.00	0.00	0.00		0.00
1900-2000	0.00	0.00	0.00	0.00		0.00
2000-2100	0.00	0.00	0.00	0.00		0.00
2100-2200	0.00	0.00	1.00	0.00		0.00
2200-2300	0.00	0.00	1.00	0.00		1.00
2300-2400	0.00	1.00	1.00	0.00		0.00

TABLE B-18

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 27, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100	0.00	0.00	0.00	0.00		0.00
0100-0200	1.00	1.00	0.00	0.00		0.00
0200-0300	0.00	1.00	0.00	1.00		0.00
0300-0400	0.00	0.00	0.00	0.00		0.00
0400-0500	0.00	1.00	1.00	0.00		
0500-0600	0.00	0.00	1.00	0.00		
0600-0700		0.00	1.00	0.00		
0700-0800		1.00	1.00	0.00		
0800-0900		0.00	0.00	0.00		
0900-1000		0.00	0.00	0.00		
1000-1100		0.00	1.00	0.00		
1100-1200		0.00	0.00	0.00		
1200-1300		1.00	0.00	0.00		
1300-1400		1.00	0.00	1.00		
1400-1500		0.00	0.00	0.00		
1500-1600		0.00	0.00	0.00		
1600-1700		0.00	0.00	0.00		
1700-1800		1.00	0.00	0.00		
1800-1900		1.00	1.00	0.00		
1900-2000		0.00	0.00			
2000-2100		0.00	1.00			
2100-2200		0.00	0.00			
2200-2300			0.00			
-2400			0.00			

TABLE B-19

HOURLY RATE OF CHANGE (^{o}F)
AT SELECTED MONITORING STATIONS IN LOWER BISCAYNE BAY ON AUGUST 28, 1968

TIME	STATION					
	H13	H13A	H14	E9	C6	B4
2400-0100			0.00			
0100-0200			0.00			
0200-0300			0.00			
0300-0400			0.00			
0400-0500			0.00			
0500-0600			0.00			
0600-0700			0.00			
0700-0800			1.00			
0800-0900			1.00			
0900-1000			0.00			
1000-1100			0.00			
1100-1200			0.00			
1200-1300			0.00			
1300-1400			0.00			
1400-1500						
1500-1600						
1600-1700						
1700-1800						
1800-1900						
1900-2000						
2000-2100						
2100-2200						
2200-2300						
?-2400						

DATE	STATION A1			STATION B4			STATION D8			STATION E9			STATION F11			STATION G15		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
04-10-68	81	76	78.4	80	75	77.1	79	76	77.2	80	78	78.6	80	77	79.2	79	76	77.4
04-11-68	82	79	79.2	80	76	76.9	79	76	77.4	80	77	77.9	80	76	79.2	79	77	76.9
04-12-68	75	74	74.7	76	71	72.4	77	71	73.2	78	74	74.4	77	74	74.4	76	74	73.6
04-13-68	74	71	72.6	72	69	70.4	74	71	72.4	75	73	73.9	74	72	73.2	73	71	72.5
04-14-68	76	71	73.1	74	70	71.6	74	71	72.7	75	74	74.4	75	72	73.7	74	71	72.5
04-15-68	76	73	74.0	74	71	72.4	74	72	73.1	75	74	74.4	76	73	74.4	74	71	72.7
04-16-68	76	73	74.4	76	71	72.9	76	72	73.2	76	74	75.1	77	73	75.0	74	71	73.1
04-17-68	77	74	75.2	76	72	73.9	77	71	74.1	77	74	76.2	78	74	76.0	76	73	73.9
04-18-68	79	75	76.7	78	74	75.6	77	74	75.4	78	76	77.0	80	75	77.7	76	74	75.5
04-19-68	81	77	79.2	80	76	77.6	79	75	77.1	80	77	78.4	81	78	79.2	78	75	77.5
04-20-68	82	79	80.2	81	77	78.7	80	76	77.9	80	77	79.4	82	79	79.9	80	77	78.4
04-21-68	82	79	80.7	82	77	79.4	80	76	77.7	81	78	79.6	82	79	80.2	80	78	79.0
04-22-68	82	79	80.7	82	78	79.5	80	76	78.2	81	79	80.1	82	79	80.6	81	78	79.1
04-23-68	83	80	82.0													80	79	79.5

TABLE B-20

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN APRIL 10 AND APRIL 23, 1968

DATE	STATION H13			STATION H14		
	MAX	MIN	MEAN	MAX	MIN	MEAN
04-10-68	79	74	76.4	79	75	76.5
04-11-68	79	76	77.1	79	76	77.6
04-12-68	74	72	73.1	74	72	73.6
04-13-68	73	69	70.9	73	70	71.2
04-14-68	74	69	71.7	74	70	71.4
04-15-68	74	71	72.2	74	71	72.2
04-16-68	75	71	72.6	74	72	72.7
04-17-68	76	71	73.1	76	72	73.7
04-18-68	78	73	75.5	78	74	75.2
04-19-68	79	76	77.9	79	76	77.2
04-20-68	81	77	79.1	80	78	78.9
04-21-68	82	78	79.7	80	78	79.4
04-22-68	82	78	79.1	80	77	79.1
04-23-68				80	79	80.0

TABLE B-20 (Contd)

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN APRIL 10 AND APRIL 23, 1968

DATE	STATION B4			STATION D8			STATION E9			STATION H13			STATION H14		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
04-24-68	82	78	80.2	82	78	80.0	82	80	80.6	82	78	80.1	82	79	80.2
04-25-68	82	80	80.2	81	78	80.1	82	80	81.3	83	79	80.6	83	79	81.0

TABLE B-21

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN APRIL 24 AND APRIL 25, 1968

DATE	STATION A1			STATION B4			STATION C6			STATION D8			STATION E9			STATION G12		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
05-04-68	82	78	80.0	80	76	77.7	80	78	79.0	82	79	80.6	80	78	78.6	82	77	79.2
05-05-68	82	78	79.4	80	76	78.1	80	76	77.7	82	80	80.2	80	78	78.5	80	77	78.7
05-06-68	80	78	78.9	79	75	76.5	79	77	77.7	81	78	79.5	79	77	77.7	80	76	77.5
05-07-68	80	78	78.1	78	76	77.0	78	76	77.5	80	79	79.4	78	77	77.5	78	76	77.0
05-08-68	78	75	75.9	76	73	74.1	76	75	75.9	78	77	77.6	77	76	76.1	75	74	74.7
05-09-68	76	74	75.0	74	71	73.1	75	74	74.2	77	76	76.2	75	74	74.6	74	73	73.9
05-10-68	76	74	74.7	74	72	72.7	74	73	73.5	76	75	75.6	75	74	74.2	75	73	73.7
05-11-68	76	75	75.5	74	73	73.0	74	73	73.5	77	76	76.4	76	74	74.4	76	74	74.6
05-12-68	80	76	77.4	78	73	74.5	78	74	75.5	80	77	77.9	78	75	75.7	79	75	76.2
05-13-68	81	78	79.7	81	76	77.9	81	77	78.0	81	78	79.5	79	77	77.9	81	77	78.9
05-14-68	84	79	81.4	85	76	79.1	82	78	79.4	82	80	80.4	80	78	78.9	82	78	79.4
05-15-68	86	80	82.3	84	77	80.1	82	78	80.2	83	81	81.5	81	79	79.6	83	79	81.0
05-16-68	84	82	83.2	84	78	81.6	82	80	81.0	84	81	82.1	82	80	80.5	84	81	82.4
05-17-68	85	82	84.5															
05-18-68	86	81	84.5															
05-19-68	86	83	84.0															

TABLE B-22

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN MAY 4 AND MAY 19, 1968

DATE	STATION G15			STATION H13			STATION H14		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
05-04-68	82	79	80.0	84	80	82.6	82	79	80.7
05-05-68	81	79	80.0	34	79	81.0	82	78	79.1
05-06-68	80	78	78.7	82	78	80.0	81	77	79.1
05-07-68	80	78	78.7	82	80	80.7	80	79	79.0
05-08-68	79	75	76.4	82	78	78.7	79	76	76.9
05-09-68	76	75	75.5	78	75	75.5	77	75	76 0
05-10-68	76	74	75.1	76	74	74.7	76	74	75.1
05-11-68	76	75	75.5	76	74	75.1	76	75	75.5
05-12-68	80	76	76.6	80	75	77.2	80	75	77.4
05-13-68	81	78	79.1	84	78	80.2	82	78	80.0
05-14-68	82	79	80.1	88	79	81.9	84	79	80.9
05-15-68	84	80	81.9	86	71	84.0	85	81	83.7
05-16-68	84	81	83.0	87	83	84.9	85	82	83.4

TABLE 22 (Contd)

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{O}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN MAY 4 AND MAY 19, 1968

DATE	STATION B4			STATION C6			STATION D8			STATION G12			STATION H13			STATION H14		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
05-18-68	85	81	83.2	83	80	82.0	86	82	84.1	86	81	83.2	87	82	84.6	86	82	84.6
05-19-68	86	81	84.0	84	81	82.6	86	83	85.2	86	81	83.9	87	82	84.7	87	83	85.2
05-20-68	84	82	83.2	84	82	83.1	86	84	85.6	85	83	84.2	86	84	84.7	86	84	85.5
05-21-68	86	81	83.6	84	82	82.9	87	84	85.5	86	83	84.2	87	84	85.0	87	84	85.5
05-22-68	86	82	84.1	85	82	83.5	87	84	85.5	87	84	84.7	88	83	85.2	88	84	85.6
05-23-68	84	80	82.4	83	82	82.5	87	84	84.5	85	82	83.9	86	82	84.4	86	83	84.2
05-24-68	82	79	80.2	82	80	80.7	86	83	83.5	83	80	81.9	84	81	82.7	84	82	83.4
05-25-68	81	79	79.9	81	80	80.2	84	82	83.0	83	81	81.7	84	81	83.1	84	82	82.6
05-26-68	80	79	79.5	80	79	79.2	83	81	82.1	83	81	82.0	83	81	81.9	83	82	82.5
05-27-68	82	77	79.0	80	78	79.2	83	81	82.1	83	80	81.3	84	81	82.6	85	80	82.3
05-28-68	82	80	80.2	80	80	80.0	82	81	81.9	82	80	81.6	86	83	84.2	84	82	83.5
05-29-68	82	78	79.4	80	78	79.2	82	81	81.6	82	80	80.5	84	81	82.6	84	81	82.5
05-30-68	82	80	80.6	80	79	79.0	83	81	81.7	82	80	80.9	88	82	85.0	85	82	83.1
05-31-68				80	78	78.6				82	80	81.0	86	82	84.4	86	82	82.6
06-01-68				79	77	77.3				80	79	80.0	86	82	83.4	83	81	81.7
06-02-68										80	76	78.0	83	78	81.4	82	78	80.0

TABLE B-23

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (°F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN MAY 18 AND JUNE 2, 1968

DATE	STATION B4			STATION D8		
	MAX	MIN	MEAN	MAX	MIN	MEAN
06-01-68	79	77	78.7	82	79	80.4
06-02-68	78	75	76.9	81	78	79.6
06-03-68	76	74	74.5	80	77	78.1
06-04-68	79	73	76.7	81	76	78.5
06-05-68	81	75	78.0	83	77	79.7
06-06-68	83	76	79.5	84	79	81.1
06-07-68	85	80	81.9	84	82	82.6
06-08-68	87	82	83.9	86	83	84.2
06-09-68	86	82	83.7	86	83	84.5
06-10-68	83	78	80.9	84	82	83.6
06-11-68	84	80	81.4	86	83	84.5
06-12-68	84	78	80.1	84	82	83.6
06-13-68	86	80	82.1	86	82	84.0

TABLE B-24

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURE (^{o}F) RECORDED BY THERMOCRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN JUNE 1 AND JUNE 13, 1968

DATE	STATION B4			STATION C6			STATION D8			STATION H13			STATION H13A		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
06-15-68	86	80	82.4	84	80	81.5	82	80	80.9	90	85	88.1	86	82	83.7
06-16-68	81	77	78.9	81	79	79.9	80	78	79.7	86	80	82.7	83	80	81.9
06-17-68	79	76	77.6	80	77	78.1	79	77	78.1	84	81	81.7	82	80	80.6
06-18-68	79	76	77.9	79	76	77.7	78	76	77.5	83	80	81.5			
06-19-68	82	77	79.1	80	77	78.5	80	76	78.0	84	80	81.4			
06-20-68	82	79	80.7	80	78	79.2	80	78	78.6	87	82	84.1			
06-21-68	87	80	83.0	85	79	80.7	83	78	79.7	91	85	87.6			
06-22-68	89	83	86.4	85	82	83.2	84	81	82.1	94	86	89.6			
06-23-68	89	84	86.1	86	82	84.0	84	82	82.9	93	86	90.1			
06-24-68	89	83	85.6	86	83	84.5	84	82	83.4	92	86	89.4			
06-25-68	88	84	85.7	86	83	84.5	84	82	83.5	92	86	88.2			
06-26-68	87	82	83.4	85	82	83.4	84	82	82.6	90	84	86.6			
06-27-68	83	79	79.9	82	79	80.4	82	79	80.4	86	81	83.6			
06-28-68	80	78	79.6	80	77	79.1	80	78	79.0	85	82	83.5			
06-29-68	81	78	80.1	82	76	78.9	82	78	79.1	88	82	84.1			
06-30-68	84	80	81.7				82	79	80.0	88	84	86.0			

TABLE B-25

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN JUNE 15 AND JUNE 30, 1968

DATE	STATION B4			STATION H[illegible]A		
	MAX	MIN	MEAN	MAX	MIN	MEAN
07-03-68	83	77	80.6	89	82	85.9
07-04-68	84	79	81.9	89	84	86.5
07-05-68	84	81	82.3	89	84	86.5
07-06-68	82	80	81.5			
07-07-68	81	78	79.9			
07-08-68	82	78	79.9			
07-09-68	86	80	82.1			
07-10-68	86	81	83.5			
07-11-68	86	82	84.5			
07-12-68	88	82	84.7			
07-13-68	87	82	84.9			
07-14-68	86	80	83.4			
07-15-68	84	80	81.9			
07-16-68	86	80	82.4			
07-17-68	86	80	83.5			

TABLE B-26

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN JULY 3 AND JULY 17, 1968

DATE	STATION A1			STATION B4			STATION C6			STATION D8			STATION E9			STATION G12		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
07-28-68	90	75	86.7	89	83	87.1	88	83	85.0	86	85	85.2	86	84	85.2	90	86	87.6
07-29-68	88	84	86.6	90	85	87.4	88	84	85.7	87	85	86.1	87	85	85.9	90	87	88.2
07-30-68	90	86	87.6	89	86	87.2	87	85	86.0	87	84	86.2	86	84	86.0	89	86	88.0
07-31-68	87	84	85.5	38	84	86.1	87	84	85.1	87	84	85.6	86	84	85.5	89	85	87.1
08-01-68	88	83	85.6	89	83	86.2	86	83	84.6	86	84	85.5	86	84	85.0	89	85	86.7
08-02-68	88	84	85.9	88	85	86.1	86	84	84.6	86	84	85.!	86	84	84.7	88	84	86.5
08-03-68	86	83	84.9	86	83	84.5	85	83	83.9				84	82	83.9	86	82	84.9
08-04-68	86	81	82.5	84	81	82.9	84	81	81.5				83	82	82.5	84	82	83.0
08-05-68	89	82	84.2	87	82	84.1	84	81	81.9				84	82	82.6	87	83	84.4
08-06-68	89	83	84.6	87	83	84.9	84	82	83.0				84	82	83.2	88	84	85.7
08-07-68	88	84	85.2	38	84	85.7	86	83	83.6				86	83	84.1	88	84	85.7
08-08-68	88	85	86.1	88	84	86.1	86	83	84.1				86	83	84.6	87	84	86.0
08-09-68	90	84	85.7	87	84	85.6	86	83	84.5				85	82	83.7	86	82	85.5
08-10-68	86	82	83.6	86	82	83.9	85	81	82.7				84	82	82.9	85	82	83.6
08-11-68	86	82	84.4	86	82	83.9	84	82	83.0				84	82	83.0	86	84	84.7
08-12-68	87	83	84.6															

TABLE B-27

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{O}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN JULY 28 AND AUGUST 12, 1968

DATE	STATION G15			STATION H13			STATION H14		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
07-28-68	89	86	87.6	92	87	88.7	90	85	87.4
07-29-68	90	87	87.7	91	89	89.5	89	86	87.2
07-30-68	89	86	88.2	90	86	89.6			
07-31-68	88	85	87.2	91	86	88.5			
08-01-68	88	86	86.9	91	86	89.0			
08-02-68	88	85	86.5	91	86	88.7			
08-03-68	86	83	86.2	89	84	88.2			
08-04-68	85	84	84.1	86	82	85.9			
08-05-68	87	84	84.7	90	84	84.5			
08-06-68	87	84	85.0	89	85	87.6			
08-07-68	88	85	85.9	88	85	87.0			
08-08-68	88	85	86.6	88	85	86.9			
08-09-68	87	83	86.6	89	84	86.6			
08-10-68	86	83	85.1	87	84	86.5			
08-11-68	86	82	84.4						

TABLE B-27 (Contd)

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{O}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN JULY 28 AND AUGUST 12, 1968

DATE	STATION A1			STATION B4			STATION C6			STATION E9			STATION G12			STATION G15		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
08-12-68	89	84	86.2	89	84	86.9	86	84	84.4									
08-13-68	88	85	86.5	89	84	87.0	86	83	84.7	86	84	85.1	89	87	88.2	88	86	86.7
08-14-68	87	84	85.7	89	85	86.9	86	84	85.0	87	84	85.1	89	86	87.6	88	86	87.0
08-15-68	89	84	86.6	89	85	86.9	87	84	85.2	87	84	85.0	90	86	87.2	89	86	87.1
08-16-68	91	85	87.5	89	85	87.4	88	84	85.5	87	84	85.1	90	86	87.5	89	86	87.4
08-17-68	89	85	86.9	90	85	87.4	87	84	86.0	87	84	85.7	91	86	87.9	90	86	87.6
08-18-68	90	85	87.4	90	86	87.7	88	85	86.5	87	85	85.9	90	86	88.1	89	87	87.7
08-19-68	91	85	87.2	90	86	87.5	87	85	86.2	87	84	85.7	90	85	87.1	89	86	87.5
08-20-68	91	85	87.1	90	86	88.0	88	85	86.1	87	84	86.0	90	86	87.7	90	86	88.1
08-21-68	91	85	87.1	90	86	88.0	88	85	86.2	88	85	86.2	90	86	87.9	90	87	88.1
08-22-68	89	85	86.4	90	86	87.2	88	85	86.1	87	85	86.2	90	87	88.5	90	87	88.2
08-23-68	89	85	86.2	89	86	86.4	87	85	85.5	87	85	86.0	89	86	87.7	89	87	87.9
08-24-68	88	85	85.9	88	85	86.0	86	84	84.4	87	85	85.6	88	85	86.9	88	86	87.1
08-25-68	88	85	85.9	88	85	84.6				86	84	85.2	87	85	86.5	88	86	86.7
08-26-68	87	84	85.6	86	84	84.6				85	84	84.7	87	85	86.1	87	85	86.1
08-27-68										86	84	84.7	87	86	86.4	87	85	86.1

TABLE B-28

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (°F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN AUGUST 12 AND AUGUST 27, 1968

DATE	STATION H13			STATION H13A			STATION ..14		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
08-12-68	89	87	88.0	92	88	90.0			
08-13-68	89	87	87.6	93	87	90.5	89	86	87.1
08-14-68	89	87	88.0	93	87	89.9	88	85	86.7
08-15-68	91	88	89.2	92	87	89.6	89	85	86.9
08-16-68	91	89	90.4	96	87	91.0	88	85	86.6
08-17-68	91	88	88.5	93	88	90.4	90	85	88.0
08-18-68	90	88	89.0	97	89	90.7	89	86	87.9
08-19-68	90	88	86.6	95	89	91.2	88	85	87.0
08-20-68	93	89	91.6	93	89	90.7	90	85	87.5
08-21-68	93	89	92.0	93	89	90.2	93	86	88.2
08-22-68	93	90	90.5	93	89	90.6	93	86	88.5
08-23-68	90	87	88.0	92	90	90.1	93	86	88.6
08-24-68	89	87	87.9	90	87	89.0	91	86	87.5
08-25-68	89	86	86.6				89	85	36.5
08-26-68							89	85	86.1
08-27-68							89	85	86.7

TABLE B-28 (Contd)

DAILY MAXIMUM, MINIMUM AND MEAN WATER TEMPERATURES (^{o}F) RECORDED BY THERMOGRAPHS AT STATIONS IN LOWER BISCAYNE BAY BETWEEN AUGUST 12 AND AUGUST 27, 1968